



Product Evaluation

FR45 | 0518

Engineering Services Program

The following product has been evaluated for compliance with the wind loads specified in the International Residential Code (IRC) and the International Building Code (IBC).

This product evaluation is not an endorsement of this product or a recommendation that this product be used. The Texas Department of Insurance has not authorized the use of any information contained in the product evaluation for advertising, or other commercial or promotional purpose.

This product evaluation is intended for use by those individuals who are following the design wind load criteria in Chapter 3 of the IRC and Section 1609 of the IBC. The design loads determined for the building or structure shall not exceed the design load rating specified for the products shown in the limitations section of this product evaluation. This product evaluation does not relieve a Texas licensed engineer of his responsibilities as outlined in the Texas Insurance Code, the Texas Administrative Code, and the Texas Engineering Practice Act.

For more information, contact TDI Engineering Services Program at (800) 248-6032.

Evaluation ID: FR-45

Effective Date: May 1, 2018

Re-evaluation Date: May 2022

Product Name: NUDURA® Integrated Building Technology Insulated Concrete Form System

Manufacturer: NUDURA® Inc.
27 Hooper Road, Unit 10
Barrie, Ontario L4N9S3
Canada
(866) 468-6299

General Description:

NUDURA® Integrated Building Technology Insulated Concrete Forms (ICF's) are used as stay-in-place permanent form work for structural concrete, load bearing and non-load bearing, below grade and above grade walls. The forms are used in construction of plain and reinforced concrete beams, lintels, exterior and interior walls, foundations and retaining walls. The forms remain in place after placement and curing of concrete which is required by all codes to be protected by approved interior and exterior finish material. The ICF's consist of expanded-polystyrene (EPS) foam-plastic panels connected with plastic cross ties. The forms are classified as a flat ICF wall system. NUDURA® ICF'S are available in a standard length of 96" and a standard height of 18 inches. NUDURA® Forms are also available in widths of 9-1/4, 11-1/4, 13-1/4, 15-1/4, and 17-1/4" to enable formation of 4", 6", 8", 10", and 12" thick flat monolithic concrete walls respectfully.

Limitations:

- **Fasteners:** Lateral and withdrawal strength must be in compliance with the appropriate section(s) of ICC'S AC 353.
- **Design Pressure:** The allowable capacities of fasteners must be as shown in Table 1.
- **Cross-Ties:** Plastic cross-ties will only be used in this product evaluation.
- **IBC Method:** Concrete walls formed by the NUDURA ICF's must be designed and constructed in accordance with 2006 IBC Chapters 16 and 19, as applicable. Footings and foundations must be designed and constructed in accordance with 2006 IBC Chapter 18.
- **IRC Method:** Concrete walls formed by the NUDURA ICF's must be designed and constructed in accordance with 2006 IBC Sections R404.4 and R611 for flat ICF Wall Systems. Footings and foundations must be designed and constructed in accordance with 2006 IRC Chapter 4.
- **Alternate IRC Method:** When buildings constructed under the 2006 IRC Sections R404.4.1B and R611.2, the structural analysis and design of the concrete must be must be in accordance with ACI 318 and 2006 IBC Chapter 19. The empirical design approach specified in AC 318 Section 14.5 is applicable to the design of concrete walls formed by the NUDURA ICF's.

Table 1. Allowable Capacities of Fasteners in Cross-Tie Flanges

Fasteners	Allowable Load Capacity (LBF)	
	Lateral	Withdrawal
Paulin Drive-Grip 6 x 2 Course-Drywall Screw	65	40
# 8 x 2 Metal Screws Number 608-64	55	44
Compass Marker Darts 8 x 1-3/4 Cement Board Screws	83	47
No. 8 x 2 Construction Screws Number 214-633	80	47
No. 10 x 2 Metal Screws Number 208-700	76	47
No. 10 x 2 wood screw Number 197-700	89	51
Trillium Screw 10 x 2 Hex Head with Washer Course Thread Self-Tapping	109	51
No. 12 x 2 Metal Screw	89	49
Fastenal HWSL SMS 14 X 2 ZA Screws Number 1131155	73	55
1/4 - 14 x 1-3/4 AB Screws	103	50

Installation Instructions:

General: NUDURA ICFs must be installed in accordance with the NUDURA® published installation instructions, this product evaluation and applicable codes. Installation instructions must address the preparation, assembly, and installation of the ICF's including cross-ties, rebar specifications and placement concrete specifications and placement; and interior and exterior finish specifications and method of application.

NUDURA ICFs systems must be designed and inspected by a Texas licensed professional engineer appointed by the TDI as a qualified inspector for compliance with the applicable building specifications adopted by the TDI. The design and analysis of NUDURA ICFs must follow the guidelines published in ICC's AC 353.

The NUDURA ICFs must be fabricated, identified and erected in accordance with this report, the approved construction documents and the applicable building codes. In the event of a conflict between

manufacturer's published installation instructions and this report, NUDURA installation instructions must govern. Approved construction documents must be available at all times on the jobsite during installation. Structures built using the NUDURA ICFs must be designed by a Texas licensed professional engineer. The basic wind speed and the exposure category used for the design must also be referenced.

Design loads: Design wind loads for the NUDURA® (ICFs) must be determined using the wind load requirements for the structure as specified in the building specifications adopted by the Texas Department of Insurance.

Foundation: The foundation is considered to be part of the structure and must be considered part of the design of the structure. If the foundation is not designed by the engineer responsible for the design of the NUDURA® (ICFs), then the design plans must include such. As a minimum, the design plans must indicate how the NUDURA ICF's is to be anchored to the foundation. If the foundation is included as part of the design then the design plans must include all details and specifications related to the design of the foundation to resist the specified wind loads and must indicate how the structure is to be anchored to the foundation.

Roof Coverings: The design plans must indicate the requirements for the roof coverings. The roof coverings must comply with the building specifications adopted by the Texas Department of Insurance. For roof coverings other than asphalt shingles, the design plans must specify the design pressure requirements for the roof covering. The roof covering must be installed as required to resist wind pressure.

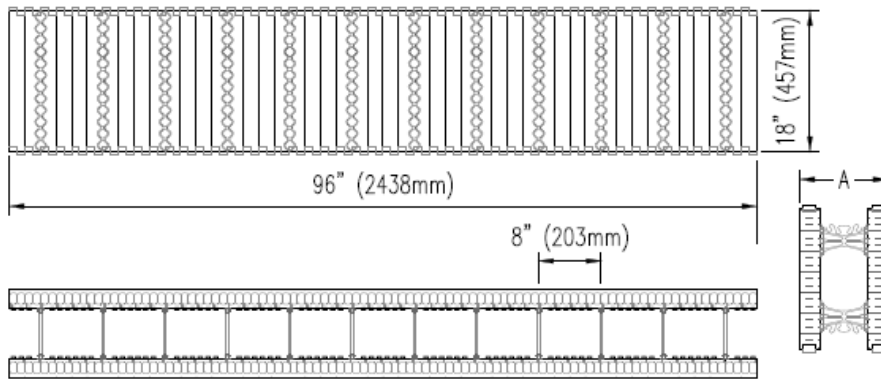
Exterior Wall Coverings: Exterior wall coverings must be installed as required to resist wind pressure. Products must comply with the building specifications adopted by the Texas Department of Insurance. The design plans must specify the design pressure requirements for the exterior wall covering.

Windows, Doors, Garage Doors and Skylights: Products must be installed as specified in evaluation reports to resist wind pressure. Products must comply with the building specifications adopted by the Texas Department of Insurance. The design plans must specify the design pressure requirements for these products. The design plans must indicate if the products are required to be windborne debris resistant. Windborne debris resistant products must be installed as specified in the evaluation reports to resist wind pressure and windborne debris.

Shutters: The design plans must indicate if shutters are required. Products must be installed as specified in the evaluation reports or the building specifications adopted by the Texas Department of Insurance as required to resist wind pressure and windborne debris. Products must comply with the building specification adopted by the Texas Department of Insurance. The design plans must specify the design pressures requirement for the shutters.

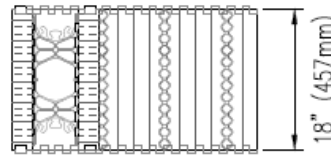
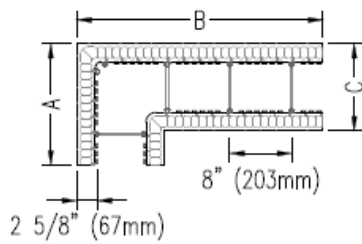
Note: A set of sealed plans, manufacturer's installation instructions, NUDURA ICF's, and this product evaluation report must be available to the inspector at the job site at all times. All fasteners must be corrosion resistant as specified in the International Residential Code (IRC), the International Building Code (IBC), and the Texas Revisions.

FIGURE 1 - STANDARD FORM UNIT



NOMINAL CONCRETE CORE	DIMENSION A (IMP)	DIMENSION A (MET)
4" (102mm)	9 1/4"	235mm
6" (152mm)	11 1/4"	286mm
8" (203mm)	13 1/4"	337mm
10" (254mm)	15 1/4"	387mm
12" (305mm)	17 1/4"	438mm

FIGURE 2 - 90 DEGREE CORNER FORM UNIT



NOMINAL CONCRETE CORE	DIMENSION		
	A	B	C
4"	15 5/8"	31 5/8"	9 1/4"
6"	15 5/8"	31 5/8"	11 1/4"
8"	17 5/8"	33 5/8"	13 1/4"
10"	19 5/8"	35 5/8"	15 1/4"
12"	21 5/8"	37 5/8"	17 1/4"
102mm	397mm	803mm	235mm
152mm	397mm	803mm	286mm
203mm	448mm	854mm	337mm
254mm	498mm	905mm	387mm
305mm	549mm	956mm	438mm

FIGURE 3 - 45 DEGREE CORNER FORM UNIT

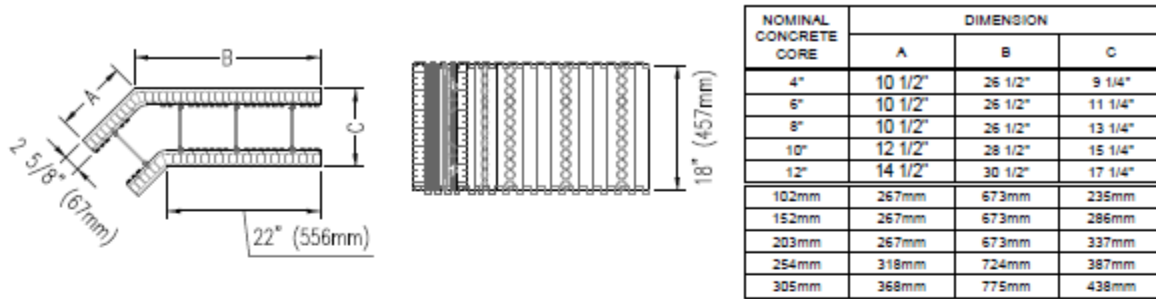


FIGURE 4 - TAPER TOP FORM UNIT

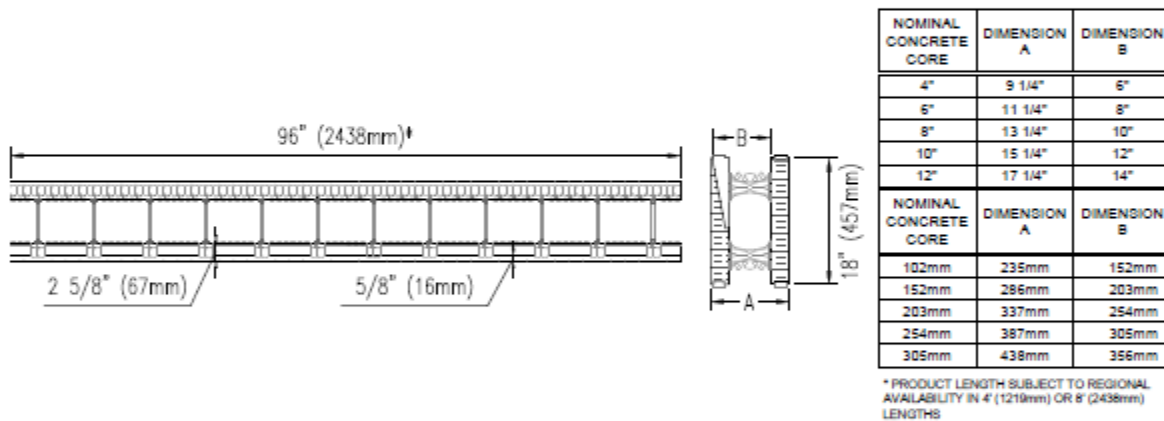


FIGURE 5 - DOUBLE SIDED TAPER TOP FORM UNIT

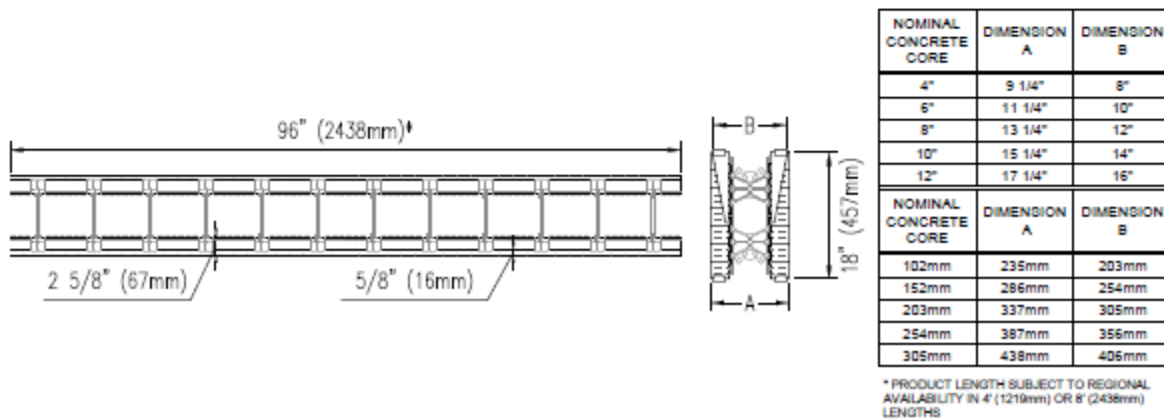
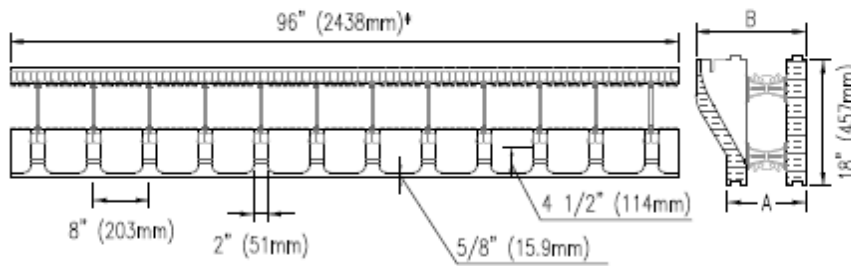


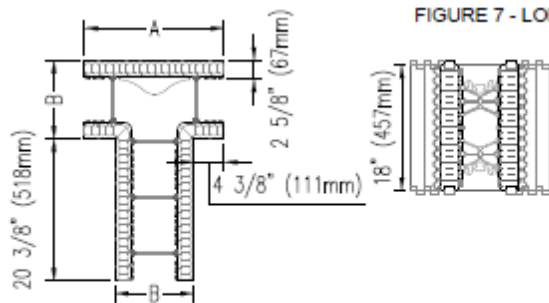
FIGURE 6 - BRICK LEDGE FORM UNIT



NOMINAL CONCRETE CORE	DIMENSION A	DIMENSION B
4" (102mm)	9 1/4"	13 3/4"
6" (152mm)	11 1/4"	15 3/4"
8" (203mm)	13 1/4"	17 3/4"
10" (254mm)	15 1/4"	19 3/4"
12" (305mm)	17 1/4"	21 3/4"
NOMINAL CONCRETE CORE	DIMENSION A	DIMENSION B
102mm	235mm	349mm
152mm	286mm	400mm
203mm	337mm	451mm
254mm	387mm	502mm
305mm	438mm	552mm

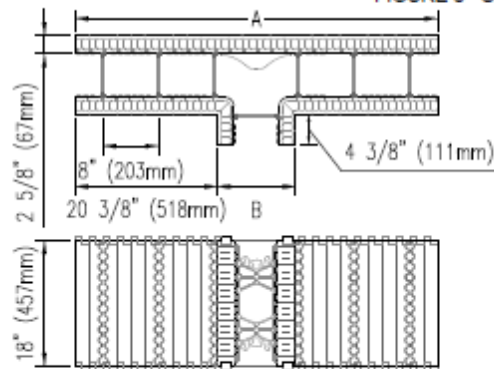
* PRODUCT LENGTH SUBJECT TO REGIONAL AVAILABILITY IN 4' (1219mm) OR 8' (2438mm) LENGTHS

FIGURE 7 - LONG T-FORM UNIT



NOMINAL CONCRETE CORE	DIMENSION A (IMP)	DIMENSION B (IMP)	DIMENSION A (MET)	DIMENSION B (MET)
4" (102mm)	18"	9 1/4"	457mm	235mm
6" (152mm)	20"	11 1/4"	508mm	286mm
8" (203mm)	22"	13 1/4"	559mm	337mm
10" (254mm)	24"	15 1/4"	610mm	387mm
12" (305mm)	26"	17 1/4"	660mm	438mm

FIGURE 8 - SHORT T-FORM UNIT



NOMINAL CONCRETE CORE	DIMENSION A (IMP)	DIMENSION B (IMP)	DIMENSION A (MET)	DIMENSION B (MET)
4" (102mm)	50"	9 1/4"	457mm	235mm
6" (152mm)	52"	11 1/4"	508mm	286mm
8" (203mm)	54"	13 1/4"	559mm	337mm
10" (254mm)	56"	15 1/4"	610mm	387mm
12" (305mm)	58"	17 1/4"	660mm	438mm

FIGURE 9 - BRICK LEDGE EXTENSION

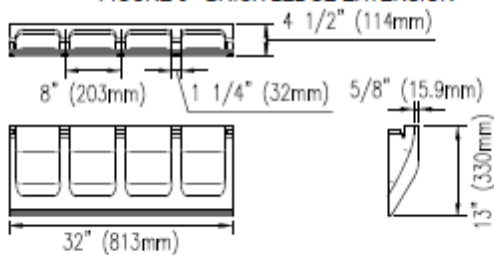
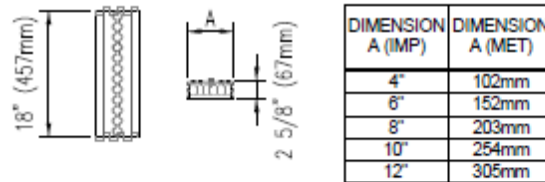


FIGURE 10 - END CAP WITH FASTENING STRIP



DIMENSION A (IMP)	DIMENSION A (MET)
4"	102mm
6"	152mm
8"	203mm
10"	254mm
12"	305mm

FIGURE 11 - 4 WAY WEB CONNECTOR



FIGURE 12 - HEIGHT ADJUSTER WITH FASTENING STRIPS

