1. Product Name
NUDURA® Integrated Building Technology
Insulated Concrete Form System

2. Manufacturer
NUDURA® Corporation
27 Hooper Road, Unit 10
Barrie, Ontario L4N 9S3
CANADA
North America Toll Free: 866 468-6299
Phone: + 705 726-9499
Fax: + 705 726-2110
E-mail: info@nudura.com
Website: www.nudura.com

3. Product Description

Basic Use
NUDURA® Integrated Building Technology Insulated Concrete Forms (ICFs) are used as stay-in-place permanent formwork 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, and foundation 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. Subject to the specific provisions for codes for each country the forms may also be used for applications requiring:

- Fire resistive construction
- Non-combustible construction for buildings of any height and any building area.

Composition & Materials
NUDURA® Insulated Concrete Forms consist of two uniform thickness panels of expanded polystyrene (EPS) foam plastic insulation material that are cross-linked in parallel with a combination of injection molded polystyrene fastening strips fitted with polypropylene plastic insert webs and integrally molded foldable polypropylene hinged web/fastening strips. The EPS panels are connected together with either integrally molded foldable high-density polypropylene hinged web/fastening strips or injection molded high-density polystyrene fastening strips interlinked with high-density polypropylene hinged web/fastening strips. The web/fastening strips run full height of the form panels and are embedded within the EPS at regular 8 inch (203mm) intervals and are recessed 1/2 inch (12.7mm) from the EPS surface and feature a surface fastening flange that measures 1 ½” (38mm) in width. The webs connecting to the fastening strips also have openings to permit concrete to pass through and feature a variety of seat options for support and lockage of horizontal steel reinforcing bars. Either configuration of web/fastening strip serves to separate the EPS panels at a prescribed core distance and provide anchorage surface for attachment of interior and exterior finishes.

Both the EPS panels and web/fastening strips are molded with a preformed reversible interlock and vertical clip-locking mechanism on their top and bottom edges to facilitate stacking and vertical inter-locking of the form units.

Concrete:
Concrete is typically specified as normal-weight concrete, complying with the applicable code, having a maximum aggregate size of ½-inch (13mm) for up to 6-inch (150 mm) core forms and ¾ inch (19 mm) for 8-inch (203 mm) core forms and beyond and a minimum compressive strength of 2,500 psi (17.25 MPa) at 28 days.

Reinforcement:
Walls are normally reinforced with deformed steel bars, having a minimum yield stress of either 40 Ksi (275 MPa) or 60 Ksi (413 MPa) depending upon the structural design.

Other Components:
Wood members in contact with concrete or plates or window and door framing shall be treated with an approved wood preservative in accordance with the applicable code. Materials other than wood, such as vinyl, are permitted for window and door framing if approved by the building official.
LIMITATIONS
Refer to NUDURA’s® Design Specification Manual for suggested use limitations for each core thickness of form and for general guidance on the most appropriate cavity thickness of form for each wall design scenario. Brick ledges are limited to a factored structural load capacity of 1,440 lbs (6.405 KN)

4. Technical Data
APPLICABLE STANDARDS - USA
ACI 318 - Building Code Requirements for Structural Concrete
ASTM C578 - Standard Spec. for Rigid, Cellular Polystyrene Thermal Insulation
ASTM D1761 -Mech. Fasteners in Wood
ASTM E84 - Surface Burning Characteristics of Building Materials
ASTM E-119 - Fire Testing of Building Construction and Materials
NFPA 259 - Standard Test Method for Potential Heat of Building Materials
NFPA 268 - Flammability of Interior Wall Assemblies via Radiant Heat Energy Source
NFPA 285 - Flammability Characteristics of Exterior Wall Assemblies Containing Components Using the Intermediate Scale Multi-Story Test Apparatus
NFPA 286 - Evaluating Room Fire Growth Contribution of Wall and Ceiling Int. Finish,
APPLICABLE STANDARDS - CANADA
CAN-S114 – Determination of Non- Combustibility in Building Materials
CAN-S124 – Evaluation of Protective Coverings for Foamed Plastic
CAN/CSA A23.1 Concrete Materials and Methods of Concrete
CAN/ULC-S101 – Fire Endurance Testing of Building Construction and Materials
CAN/ULC-S102 - Surface Burning Characteristics of Building Materials and Assemblies
CAN/ULC-S134 - Fire Test of Exterior Wall Assemblies
CAN/ULC-S701 – Thermal Insulation, Polystyrene, Boards and Pipe Covering

APPROVALS
System is currently approved for compliance with the following Building Codes
USA Under ICC-ES ESR-2092
• 2003 International Building Code®
• 2003 International Residential Code®
• 1999 BOCA® National Building Code®
• 1999 Standard Building Code®
• 1997 Uniform Building Code™
CANADA Under CCMC 13063-R
• 2005 National Building Code
• 1990 Alberta Building Code
• 1995 British Columbia Building Code
• 1997 Ontario Building Code
• 2001 Quebec Building Code
EUROPEAN UNION Under EOTA/BBA 2762
• All applicable Codes for all 26 Countries of the European Union

Various individual State, Provincial and City compliances can also be provided by the manufacturer. Contact the NUDURA® for copies of these compliances as may be required for your region.

CERTIFICATIONS / LISTINGS

Plant Manufacturing is under 3rd party quarterly audit and product certification is provided by ITS N.A. Ltd. /ETL Semko

Product is also listed/classified by UL and UL Canada for fire resistance to 2, and 4 hours per the followings listings/classifications:
USA: U930 (2, and 4 hour)
CAN: W012 (2, and 4 hour)

Refer to above noted listings for applicable core thicknesses, concrete specs and finish requirements for attainment of listings or contact the manufacturer or distributor.

ENVIRONMENTAL CONSIDERATIONS
LEED® CREDIT DATA
Energy efficiency, air tightness, low waste factor, efficient construction methods and recycle content are features which suit application of NUDURA® ICF product to any GREEN Building Project or LEED Accredited facility.

LEED® Credits which NUDURA ICFs target for POTENTIAL point achievement include:

LEED® Credit Categories Potential
Sustainable Sites: 0
Water Efficiency: 0
Energy & Atmosphere: 1 - 19
Materials & Resources: 1 - 6
Indoor Environmental Quality 1
Innovation & Design Process 0
Possible Total Points 1 - 26

Contact the manufacturer for specifics on the potential contribution in each category for point attainment.

PHYSICAL/CHEMICAL PROPERTIES

EPS FOAM
Thermal Resistance Min. R4 / inch
Min. RSI 0.70
Flame Spread Rating USA <10
CAN 180
Smoke Developed Index USA <450
CAN <450
Self Ignition Temperature: Min. 650 Deg F
Min. 343 Deg C
Water Vapor Perm’ce: 0.624 Perms/
36 ng/Pa.s.m²
Water Absorption Max. 3%
Compressive Strength Min.15 psi/103.4kPa
Flexible Strength: Min. 35.0 psi /241.3kPa
Limiting Oxygen Index Min. 24%
Thermal & Humid Aging Max.2.0% Variance
Fungi Resistance: No Growth

POLYPROPYLENE WEBS
Self Ignition Temp. Min. 650 Deg F
Min. 343 Deg C
Smoke Density Rating Max. 75%
Rating of Burning Max. 1 ½”

5. Installation
Complete detailed installation recommendations are available from the manufacturer. NUDURA® regularly provides training sessions to contractors, building officials, architects and engineers through the distributors located in each country of operation. Details regarding locations of these courses are available at the Manufacturer’s website.

PREPARATORY WORK
Handle product from transport to site storage as per manufacturer recommendations. Store product in original packaging and retain on labels for QC follow-up if required. Prepare site as per manufacturer’s Installation instruction manual. -footings within +/- ¼” (6 mm).

METHODS
For detailed outline of installation processes refer to manufacturer’s installation instructions. Product is generally bond stacked on site to projected wall layout pattern course by course with horizontal steel being inserted at each course or as specified. Standard forms are cut to suit wall length as required to butted to preformed corner forms or “T”-form Units. During process, manufacturer’s approved alignment system is erected at 3rd course to facilitate wall access and alignment of wall assembly during concrete placement.
Window and Door openings are also prepared during build using permanent or temporary buck materials which will support concrete during placement. Once at projected wall height, vertical reinforcing steel is inserted into wall cavity as specified. Concrete placement is recommended using boom pump and internal vibration to assure even placement and monolithic pour condition.

**PRECAUTIONS**
Alignment system and or/scaffolding false work to remain in place until lateral connection to wall is complete or as designated by engineer of record for site. Work crews must comply with all local jobsite safety codes and standards/regulations.

**6. Availability & Cost**

**AVAILABILITY**
Product is available through North American wide distribution as well as distributorships throughout the UK, Ireland, Scotland, Wales and UAE. Product delivery is typically within 2 weeks within North America. Contact manufacturer directly on delivery times for orders in excess of 50,000 ft² (4,500m²)

**COST**
Contact manufacturer for direction to local distributor location for provision of form costs/area or total project quotations for best discounted rates. All costs of form work are supplied at distributor level only – no direct pricing is available from manufacturer.

**7. Warranty**
NUDURA Corporation provides limited warranty that product will provide and maintain both its minimum thermal resistance (R23.59 / RSI 4.158) (Conductance = 0.2405 W/m².K) and Acoustical performances properties (STC 42 for its 4-inch (102 mm) Core form) and STC 50 for its 6-inch (152mm) and above core thickness forms for a period of 30 years from date of delivery to client. Complete details of manufacturer’s limited warranties can be obtained from the manufacturer or through its distributor network.

**8. Maintenance**

**ON-SITE STORAGE**
Keep product in original packaging until ready for use. Store under tarpaulin cover or inside if storage is required over several months to protect material from prolonged UV exposure.

**DURING CONSTRUCTION**
Clean concrete splatter from surfaces while concrete is still wet. For most trowel-able finish applications, surfaces should be clean and dry. For stucco applications, surfaces will require rasping and preparation. Consult with material supplier for correct recommendations for each product.

**POST COSTRUCTION**
Protect EPS foam surfaces remaining in any unfinished condition beyond 90 days with temporary cover materials to minimize UV exposure. Once external finishes are complete, no maintenance is required.

**9. Technical Services**
NUDURA Corporation provides experienced technical services personnel on staff for general product query, design assistance and technical support. Additional support is available at the distributor level through NUDURA’s International Network of NUDURA Product Distributors. Contact the Manufacturer for more information.

**10. Filing Systems**
- Product Information Sheet
- 10-Part Specification
- 3-Part Specifications for CSI (USA) & CSC (Canada) Masterformat® 2004 Formats- Revised 2010
- Design Specification Manual and Disk available through NUDURA Sales Managers and Distributor Contacts
- Additional product information is available from the manufacturer and distributor contact upon request.

NUDURA Corporation 2011