NUDURA ® Corporation

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

2. Manufacturer
NUDURA ® Corporation
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CANADA

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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 resistant 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
integally molded foldable high-density
polypropylene hinged web/fastening strips or
injection molded high-density polystyrene
fastening strips interlinked with high-density
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 ½ø (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.

FORM TYPES, OPTIONS & SIZES
NUDURA ® standard form panels and hinged
web forms are available in a standard length
of 96 inches (2438 mm) and a standard
height of 18 inches (457mm). NUDURA ®
Forms are available in widths of 9 ¼, 11 ¼,
13 ½, 15 ¼ and 17 ½ inches (235, 286,
337, 388 and 438 mm) to enable formation of
4-inch, 6-inch, 8-inch, 10-inch and 12-
inch (102 mm, 152 mm, 203 mm, 254 mm
and 305 mm) thick flat monolithic concrete
walls respectively.

45-degree and 90-degree angle form units,
front/form units, brick ledge forms, brick ledge
extensions, height-adjusters (with fastening
ties) and end caps are also available for each
thickness of form unit offered. The corner and
front/form units are used to
construct wall intersections. The brick ledge
forms and brick ledge extensions are used
in conjunction to conduct concrete thicknesses for support or
brick or stone veneer exterior finishes or for
supporting limited load interior floor
construction.

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® 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 Polyisocyanurate 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 258 - Standard Test Method for Potential Heat of Combustion
NFPA 286 - Ignitability of Exterior 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 i Determination of Non-Combustibility in Building Materials
CAN 4-S124 i Evaluation of Protective Coverings for Foamable Plastic
CAN/CSA A23.1 Concrete Materials and Methods of Concrete
CAN/ULC-S101 i Fire Endurance Testing of Building Construction and Materials
CAN/ULC-S102 i Surface Burning Characteristics of Building Materials and Assemblies
CAN/ULC-S134 - Fire Test of Exterior Wall Assemblies
CAN/ULC-S701 i Thermal Insulation, Polyisocyanurate, 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

POLYPROPYLENE WEBS
Self ignition Temp. Min. 650 Deg F
Smoke Density Rating Max. 75%
Rating of Burning Max. 1 ½

Product is also listed/classified by UL and UL Canada for fire resistance to 2, and 4 hours per the following 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
- Sustainable Sites: Potential
- 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
Smoke Developed Index USA <450
CAN
Self Ignition Temperature Min. 650 Deg F Min. 343 Deg C
Water Vapor Permeable 0.624 Perms / 36ng/Pa.s.m²
Water Absorption Max. 3%
Compressive Strength Min. 15 psi/103.4kPa
Flexural Strength: Min. 35.0 psi / 241.3kPa
Limiting Oxygen Index Min. 24%
Thermal & Humid Aging Max. 2.0% Variance
Fungi Resistance: No Growth

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 butt to preformed corner forms or Ø 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 in 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® 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.

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