SECTION 03135

INSULATED CONCRETE FORMS - RASTRA

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
1. Insulated concrete forms for:

NOTE TO SPECIFIER: Edit the following list as applicable to project requirements.

a. Exterior structural wall construction.
b. Interior walls (structural and non-structural).
c. Basement wall construction.
d. Floor construction.
e. Roof construction
f. Retaining wall construction.

2. Installation of reinforcing steel.
3. Placement of concrete within formwork.

B. Products Installed but not Furnished Under this Section:
1. Reinforcing Steel: Furnish in accordance with Section 03200.
2. Cast -In-Place Concrete: Furnish in accordance Section 03300
3. Sleeves, inserts, anchors and bolts: Furnish in accordance with Section 05500 and other applicable sections.
4. Bucks for Windows and Doors: Furnish in accordance with Division 8.

C. Related Sections:
1. Windows and Doors: Furnish and install in accordance with Division 8.
2. Stucco, plaster, tile and other wall finishes: Furnish and install in accordance with Division 9.

1.02 REFERENCES

A. ASTM
1. ASTM C1389 (formerly ASTM E514) - Test Method for Water Penetrations and Leakage Through Masonry
2. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
3. ASTM E119 - Test methods for Fire Tests of Building Construction and Materials.
4. ASTM E331 - Test method for Water Penetrations of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
5. ASTM E136 – Test method for Behavior of Materials in a Vertical Tube Furnace.

B. UBC:
1. UBC 8-1- Test Method for Surface Burning Characteristics of Building Materials.
2. UBC 14-1 - Kraft Waterproof Building Paper.
3. UBC 26-3 - Room Fire Test Standard for Interior of Foam Plastic Systems.

1.03 SYSTEM DESCRIPTION

A. Design Requirements: Insulated concrete form system shall provide a permanent framework for a grid of reinforced concrete to form load-bearing walls, shear walls, stem walls, lintels, retaining walls and other components of the building. Channels inside the elements shall be designed to provide optimum strength while using the least possible amount of concrete.

B. Performance Requirements: In accordance with manufacturer's "Engineering Manual" and General Structural Notes on Drawings.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, design data and installation instructions.

B. Shop Drawings: Submit drawings showing layout, dimensions and construction details.

C. Test Reports: Submit reports validating product compliance with specified requirements.

1.05 QUALITY ASSURANCE

A. Pre-Installation Conference:
   1. Convene a pre-installation conference to review specifications and procedures with the Architect, Contractor, installer, manufacturer's representative, Owner and other trades relevant to the work, prior to ordering materials.
   2. Notify Architect at least 48 hours prior to starting work.
   3. Contractor shall review materials, details, etc. and submit a report including revised details to Architect. Incorporate revised details approved by Architect in the Project at no additional cost to Owner.

1.06 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to and unload onto level surface with labels intact.

B. Storage: Adequately protect against damage while stored at the site.

C. Handling: Comply with manufacturer's instructions.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Resource Management:
   1. Recycled Content: Provide insulating concrete form containing 85% recycled content.
   2. Manufacturing:
      a. Production of 10 square feet of material shall consume approximately <2kWh of electricity with no heating process required.
      b. Residues of production shall be recycled into subsequent product production.

NOTE TO SPECIFIER: The feasibility of the following requirement should be researched with the manufacturer on a project-by-project basis based upon the location of the project.

   3. On-site waste: Remnants from building site shall be returned to fabrication plant for use in subsequent product production if feasible. They also can be shaped and used for accents in architectural detailing.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Manufacturer: RASTRA, licensed manufacturer

2.02 MATERIALS

A. Insulated concrete forms
   1. Material: THASTYRON.
      a. Recycled-content, post-consumer expanded polystyrene: $\pm$85% by volume.
      b. Bulk density: 22 lb/ft^3 $\pm$10%.
      c. Compressive strength: 56 psi.
      d. Tensile strength: 43 psi
      e. Water vapor transmission: 7.3
      f. Fire Endurance (10 inch wall thickness per ASTM E119): 4 hours rating per UL R14366, 9/91, 2/99

g. Thermal barrier (Room fire test):
   1) No flame spread.
   2) No smoke development.
   3) Wall meets UBC 26-3.
h. Surface burning characteristics (ASTM E84, NFPA 255, UBC 8-1):
   1) Flame spread index: 0.
   2) Smoke development index: 5.
   3) NFPA Class A
   4) UBC Class 1
i. Frost resistance: Highly frost resistant.
j. Toxicity: Low
k. Formation of mildew: Mildew and fungus growth is not anticipated.
l. Water transmission: Meets the following requirements.
   1) ASTM E331
   2. ASTM C1389 (formerly ASTM E514)
   3. UBC 14-1 (grade "C" Kraft paper).
m. Average wall humidity: Average 2.5% by volume.
n. Expansion: 0.0018 inch/foot.
o. Thermal performance (effective R-value): >23 h.^{o}Fsq.ft./Btu.
p. Sound Insulation: >50dB(a)

2. Standard Element Dimensions:
   a. Overall thickness:

NOTE TO SPECIFIER: Edit the following to list the thicknesses to be provided for this project.

      1) 8.5 inches (215mm)
      2) 10 inches (250mm)
      3) 12 inches (305mm)
      4) 14 inches (355 mm)
   b. Void Diameter:

NOTE TO SPECIFIER: Edit the following to list the thicknesses to be provided for this project.

      1) 8.5 inch (215) overall thickness: 5 inches (175mm) x 5-1/4 inch (135mm).
      2) 10 inch (250mm) overall thickness: 6 inches (155mm).
      3) 12 inch (305mm) overall thickness: 6 inches (155mm).
      4) 14 inch (355 mm) overall thickness: 6 inches (155mm).
   c. Outside wall thickness (void to outside face):

NOTE TO SPECIFIER: Edit the following to list the thicknesses to be provided for this project.

      1) 8.5 inch (215) overall thickness: 1.75 inches (45mm).
      2) 10 inch (250mm) overall thickness: 2 inches (50mm).
      3) 12 inch (305mm) overall thickness: 3 inches (76mm).
      4) 14 inch (355 mm) overall thickness: 4 inches (100mm).
   d. Length:

NOTE TO SPECIFIER: Edit the following to list the thicknesses and lengths to be provided for this project.

      1) 8.5 inch (215) overall thickness: 90 inches (2286mm).
      2) 10 inch (250mm) overall thickness: 90 inches (2286mm) or 120 inches (3050mm).
      3) 12 inch (305mm) overall thickness: 90 inches (2286mm) or 120 inches (3050mm).
      4) 14 inch (355 mm) overall thickness: 90 inches (2286mm) or 120 inches (3050mm).

3. Standard Element Volumes and Weights:

NOTE TO SPECIFIER: Edit the following to list the thicknesses and lengths to be provided for this project.

   a. 8.5 inch (215) overall thickness by 90 inch (2286mm) length:
      1) Outside: 6.64 cubic feet (188dm^3)
      2) Cavity: 1.97cubic feet (56dm^3)
      3) Net: 4.67 cubic feet (132dm^3)
      4) Weight: 112 lbs. (51kg) $\pm$10%
   b. 10 inch (250mm) overall thickness by:
      1) 90 inch (2286mm) length::

a) Outside: 7.81 cubic feet (221dm^3)
b) Cavity: 2.73 cubic feet (77dm^3)
c) Net: 5.08 cubic feet (144dm^3)
d) Weight: 120 lbs. (54kg) ±10%

2) 120 inch (3050mm) length::
a) Outside: 10.42 cubic feet (294dm^3)
b) Cavity: 3.67 cubic feet (104dm^3)
c) Net: 6.75 cubic feet (190dm^3)
d) Weight: 158 lbs. (72kg) ±10%

c. 12 inch (305mm) overall thickness by:

1) 90 inch (2286mm) length::
a) Outside: 9.37 cubic feet (265dm^3)
b) Cavity: 2.73 cubic feet (77dm^3)
c) Net: 6.64 cubic feet (188dm^3)
d) Weight: 148 lbs. (68kg) ±10%

2) 120 inch (3050mm) length::
a) Outside: 12.5 cubic feet (354dm^3)
b) Cavity: 3.67 cubic feet (104dm^3)
c) Net: 8.83 cubic feet (250dm^3)
d) Weight: 197 lbs. (90kg) ±10%

d. 14 inch (355 mm) overall thickness by:

1) 90 inch (2286mm) length::
a) Outside: 10.94 cubic feet (309dm^3)
b) Cavity: 2.73 cubic feet (77dm^3)
c) Net: 8.21 cubic feet (232dm^3)
d) Weight: 183 lbs. (83kg) ±10%

2) 120 inch (3050mm) length::
a) Outside: 14.58 cubic feet (412dm^3)
b) Cavity: 3.67 cubic feet (104dm^3)
c) Net: 10.91 cubic feet (308dm^3)
d) Weight: 243 lbs. (110kg) ±10%

NOTE TO SPECIFIER: Include the following (flat panels) if applicable to project.

4. Flat Panels:

a. Thickness

NOTE TO SPECIFIER: Edit the following to list the thicknesses to be provided for this project.

1) 2 inches (50mm)
2) 4 inches (100mm)

b. Width: 30 inches (760 mm)

c. Length:

NOTE TO SPECIFIER: Edit the following to list the thicknesses to be provided for this project.

1) 2 inch (50mm) thickness: 60 inches (1525mm)
2) 4 inch (100mm) thickness: 120 inches (3050mm)

d. Weight:

NOTE TO SPECIFIER: Edit the following to list the thicknesses to be provided for this project.

1) 2 inch (50mm) thickness: 50 lbs. (23 kg) ±10%.
2) 4 inch (100mm) thickness: 190 lbs. (86 kg) ±10%.

5. Provide special element sizes and shapes required or as shown on Drawings.

B. Reinforcing steel: In accordance with Section 03200. Sizes shall be as indicated on drawings.

C. Concrete: In accordance with Section 03300 and as follows:
1. Compressive strength at 28 days: In accordance with General Structural Notes.
2. Aggregate size: In accordance with insulated concrete form manufacturer's recommendation for size of void to be provided.
3. Slump: In accordance with General Structural Notes and insulated concrete form manufacturer's recommendation for size of void to be provided.

D. Adhesive for joining insulated concrete forms: “Rastra R-Foam” PU – adhesive, as provided by manufacturer or other high-yield foam products approved by manufacturer.

2.03 EQUIPMENT

A. Tools and Supplies shall be as recommended by manufacturer's Installation Guide.

2.04 FABRICATION

A Tolerances:

NOTE TO SPECIFIER: Edit the following to list the thicknesses and lengths to be provided for this project.

1. 8.5 inch (215) overall thickness:
   a. Overall thickness: ±1/8 inch.
   b. Voids: +3/4 inch (openings may be oblong instead of round, created by reducing the thickness of 10 inch elements in the center.
   c. Outside wall thickness (void to outside face): ±3/8 inch
2. 10 inch (250mm) overall thickness
   a. Overall thickness: ±1/8 inch.
   b. Voids: +1/2 inch (openings may be oblong instead of round)
   c. Outside wall thickness (void to outside face): +1/2 inch, -3/8 inch
3. 12 inch (305mm) overall thickness
   a. Overall thickness: ±1/8 inch.
   b. Voids: +1/2 inch (openings may be oblong instead of round)
   c. Outside wall thickness (void to outside face): ±1/2 inch
4. 14 inch (355 mm) overall thickness
   a. Overall thickness: ±3/16 inch.
   b. Voids: +1/2 inch (openings may be oblong instead of round)
   c. Outside wall thickness (void to outside face): ±5/8 inch
5. Length: +1/2 inch, -3/8 inch.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:
   1. Examine sub-surfaces to receive Work and report detrimental conditions in writing to Architect.
   2. Examine footings to verify that they are within acceptable tolerances for installation of wall panels.
   3. Commencement of Work will be construed as acceptance of sub-surfaces.

B. Coordination: Coordinate with other work, which affects, connects with, or will be concealed by this Work.

3.02 INSTALLATION

A. In accordance with manufacturer's Installation Guide.

3.03 CLEANING

A. During the course of the Work and on completion of the Work, reuse, recycle, or remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION