

Precast Concrete Building
12' x 20', Field Assembled
Section 13120

PART 1 – GENERAL

1.01 SUMMARY

Contractor to furnish a precast concrete building. Building to be field assembled by the manufacturer on the contractor's poured-in-place foundation or precast concrete floor panel as indicated on contract drawings and in accordance with manufacturer's recommendations. Building to be provided by manufacturer with all necessary openings as specified by contractor in conformance with manufacturer's structural requirements.

1.02 QUALITY ASSURANCE

- A. ACI-318-02, "Building Code Requirements for Reinforced Concrete". Concrete Reinforcing Institute, "Manual of Standard Practice".
- B. ANSI/ASCE-7-02 "Building Code Requirement for Minimum Design Loads in Buildings and Other Structures".
- C. IBC 2006, 1996 BOCA
- D. Concrete Reinforcing Institute, "Manual of Standard Practice".
- E. UL-752 test method level 4 for bullet resistance certified by an independent structural engineer.
- F. Fabricator must be a certified producer/member of The Precast/Prestressed Concrete Institute (PCI), National Precast Concrete Association (NPCA) or equal.
- G. Building fabricator must have a minimum of 5 years experience manufacturing and setting transportable precast concrete buildings.

1.03 DESIGN REQUIREMENTS

A. Dimensions:

Exterior: 12' x 20' x 8'-8"

Interior: 11'-6" x 19'-6" x 8'-0"

B. Design Loads:

1. Seismic load performance category 'C', Exposure Group III
2. Standard Live Roof Load – 60 PSF
3. Standard Floor Load – 250 PSF
4. Standard Wind Loading – 130 MPH

C. Roof (Gabled roof style standard): Roof panel shall slope approximately 24" from front to back in the short-sided direction. The roof shall extend a minimum of 6" beyond the wall panel all around. Turndown feature which extends 1/2" below the top edge of the wall panels to prevent water migration into the building along top of wall panels is required. Roof shall also have an integral architectural ribbed edge.

D. Roof, floor, and wall panels must each be produced as single component monolithic panels. No roof, floor, or vertical wall joints will be allowed, except at corners. Wall panels shall be set on top of floor panel.

E. Floor panel or contractor supplied poured-in-place slab must have 1/2" step-down around the entire perimeter to prevent water migration into the building along the bottom of wall panels.

1.04 SUBMITTALS

A. Engineering calculations that are designed and sealed by a professional engineer, licensed to practice in the state where the project is located, shall be submitted for approval.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Concrete: Steel-reinforced, 5000 PSI minimum 28-day compressive strength, air-entrained (ASTM C260).
- B. Reinforcing Steel: ASTM A615, grade 60 unless otherwise specified.
- C. Post-tensioning Strand: 41K Polystrand CP50, .50, 270 KSI, 7-wire strand, enclosed within a greased plastic sheath, (ASTM A416). Roof and floor each to be post-tensioned by a single, continuous tendon. Said tendon shall form a substantially rectangular configuration having gently curving corners wherein the positioning of the cable member results in a pat-

tern of one or more loops and a bisecting of the loop(s). The cable member starts from one corner of the concrete building panel, forms a gentle perimeter loop(s) returning to a point where the cable member entered the concrete building panel. The tendon then turns 90° and follows the cable member(s) to a point midway along the “Y” axis of the concrete building panel and then turns 90° along the “X” axis of the concrete building panel. This bisects the concrete building panel and crosses the opposite parallel portion of the cable member and exits from an adjacent side of the concrete building panel.

1. If post-tensioning is not used in the roof panel, the following guidelines must be followed to ensure a watertight roof design.
 - a. The entire precast concrete roof panel surface must be cleaned and primed with a material that prepares the concrete surface for proper adherence to the coating material.
 - b. The entire precast concrete roof panel surface shall be sealed with a .045 EPDM continuous membrane cemented to the concrete with a compound designed for this purpose.
- D. Caulking: Joint between building and floor slab shall be caulked on the exterior and interior surface of the joints. Caulking shall be SIKAFLEX-1A elastic sealant or equal. Exterior caulk joint to be 3/8” x 3/8” square so that sides of joint are parallel for correct caulk adhesion. Back of joint to be taped with bond breaking tape to ensure adhesion of caulk to parallel sides of joint and not the back.
- E. Vents: Per design plans. Vents shall be SUNVENT #164FL or equal.
- F. Panel Connections: Monolithic structure shall be attached to precast floor slab with 3/8” thick steel brackets. Steel is to be of structural quality, hot-rolled carbon complying with ASTM A283, Grade C and hot dipped galvanized after fabrication. All fasteners to be 1/2” diameter bolts complying with ASTM A307 for low-carbon steel bolts. Cast-in anchors used for panel connections to be Dayton-Superior #F-63 or equal. All inserts for corner connections must be secured directly to form before casting panels. No floating-in of connection inserts shall be allowed. Wall panels shall be connected to floor slab with 4” expansion anchors by manufacturer.

2.02 ACCESSORIES

- A. Doors and Frames: Shall comply with Steel Door Institute “Recommended Specifications for Standard Steel Doors and Frames” (SDI-100) and as herein specified. The buildings shall be equipped with double 3’-0” x 6’-8” x 1-3/4”, 18-gauge galvanized/insulated Dominion Imperial right hand reverse metal doors with 16-gauge galvanized frames. Doors and frames shall be bonderized and painted one coat of rust inhibitive primer and one

finish coat of enamel paint; color shall be Yorktown Brown unless otherwise specified.

B. Door Hardware:

1. Handle: Lindstrom stainless steel, 8-1/2" x 2" or equal.
2. Hinges: PB-31/NRP/26D 4 1/2" x 4 1/2" (chrome-plated with non-removable hinge pins), 3 per door or equal.
3. Lock Set: PDQ Industries KR116 – 32D (stainless steel finish) or equal.
4. Surface Bolt, Upper: Cal-Royal 045901426D (satin chrome finish) or equal.
5. Surface Bolt, Lower: Cal-Royal 045901426D (satin chrome finish) or equal.
6. Astragal: A4441/68R or equal.
7. Threshold: National Guard 897V60 raised interior, extruded aluminum threshold with neoprene seal or equal.
8. Door Holder: Glynn-Johnson 904H US32D (stainless steel finish), overhead slide type surface mounted door holder or equal.
9. Drip Cap: National Guard 15D72 or equal.
10. Door Stop: Ives 445B26D (Inactive leaf only) or equal.

2.03 FINISHES

- A. Interior of Building: Smooth steel form finish on all interior panel surfaces.
- B. Exterior of Building: Architectural precast concrete brick finish: Finish must be imprinted in top face of panel while in form using an open grid impression tool similar to EASI-BRICK™. Finished brick size shall be 2 3/8" x 7 5/8" with vertical steel float or light broom finish. Joints between each brick must be 3/8" wide x 3/8" deep. Back of joint shall be concave to simulate a hand-tooled joint. Each brick face shall be coated with the following acrylic concrete stain: 1) Cementrate by FOSROC; or, 2) Canyon Tone stain by United Coatings. Stain color shall be Brick Red unless specified otherwise. Stain shall be applied per manufacturer's recommendation. Joints shall be kept substantially free of stain to maintain a gray concrete color.
- C. Exterior of Building (Options – Finish to be chosen by NAVFAC):

1. Washed brown riverstone aggregate finish on all exterior wall surfaces. Aggregate must be seeded into top of panel while in form, chemically retarded, and high-pressure washed to expose the aggregate to a depth of 1/8".
2. Skip Trowel finish
3. Broom finish
4. Barnboard finish

PART 3 – EXECUTION

3.01 SITE PREPARATION (Field assembled on cast-in-place floor)

- A. Slab on grade to be minimum 6" thick and 4,000 psi steel reinforced concrete. Slab to be level within 1/8" in both directions and capable of supporting loads imposed by the structure. Floor panel must have a 1/2" step-down around the entire perimeter to prevent water migration into the building along the bottom of wall panels.

OR

3.02 SITE PREPARATION (Field assembled on precast floor system)

- A. Precast building shall bear fully on a crushed stone base that is at least two feet larger than the length and width of building.
- B. Stone shall be a minimum of 4" thick or down to firm subgrade. The vertical soil capacity under stone shall be compacted to have minimum bearing of 1,500 pounds per square foot. Stone shall be 3/8" or smaller and must be screeded level within 1/4" in both directions. Stone shall be placed within a perimeter form with flat and level top edge for screeding. Forming material shall remain around stone until after the building is set.
- C. The crushed stone base shall be kept within the confines of the soil or perimeter form. Do not allow the stone base to become unconfined so that it may wash, erode, or otherwise be undermined.

OR

If building is placed on pavement or concrete slab, substrate below pavement or slab must have a vertical soil capacity of 1,500 pounds per square foot. Place stone or sand to 1" above highest point of area where building will be placed and at least 1'-0" wide all around the building footprint. Retain stone or sand with a perimeter form to prevent the material from washing out.

D. Provide positive drainage for the fill, concrete pad, or slab as required.

3.02 ACCESS

Contractor must provide a level unobstructed area large enough for a crane and a tractor-trailer to park adjacent to the pad. Crane must be able to place outriggers within 5'-0" of edge of pad and truck and crane must be able to get side by side under their own power. No overhead lines may be within 75' radius of center of pad. Firm roadbed with turns that allow 65' lowbed tractor-trailer must be provided directly to site. No building shall be placed closer than 2'-0" to an existing structure.