

Easi-Set® Hazardous Materials Storage Precast Concrete Buildings

Pre-Assembled

Section 13120

PART 1 – GENERAL

1.01 SUMMARY

Contractor to furnish a precast concrete transportable building. Building to be delivered and placed on owner's prepared stone foundation in accordance with manufacturer's recommendations. Precast building to be EASI-SET® brand Models as manufactured by Easi-Set Industries (ESI), Midland, Virginia, or licensed manufacturer of Easi-Set Buildings. 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.
- H. No alternate building designs to the pre-engineered EASI-SET® building will be allowed unless pre-approved by the owner 10 days prior to the bid date.

1.03 DESIGN REQUIREMENTS

- A. Standard Models Dimensions:

Model 1012: exterior - 10' x 12' x 8'-8", interior: 9'-6" x 11'-6" x 8'-0"
Model 1216: exterior - 12' x 16' x 8'-8", interior: 11'-6" x 15'-6" x 8'-0"
Model 1220: 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. Sloped Roof: Roof panel shall slope $\frac{1}{2}$ " from front to back in 10 foot direction. The roof shall extend a minimum of 2 $\frac{1}{2}$ " beyond the wall panel on each side and have a turndown design which extends $\frac{1}{2}$ " below the top edge of the wall panels to prevent water migration into the building along top of wall panels. Roof shall also have an integral architectural ribbed edge.
- D. Gabled Roof (Option): Roof panel shall slope approximately 24" from left to right or front to back in the short-sided direction. The roof shall extend a minimum of 6" beyond the wall panel all around. An optional turndown feature is available where the design extends $\frac{1}{2}$ " below the top edge of the wall panels to further prevent water migration into the building along top of wall panels. Only available with broom finish or top surface applied finishes. Roof shall also have an integral architectural ribbed edge.
- E. 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.
- F. Floor panel must have $\frac{1}{2}$ " 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 to be each 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 pattern 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 degrees and follows the cable member(s) to a point midway along the "Y" axis of the concrete building panel and then turns

90 degrees 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 $\frac{3}{8}$ " x $\frac{3}{8}$ " 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: Two screened aluminum vents to be cast in rear wall. Vents shall be SUNVENT #164FL or equal.
- F. Panel Connections: All panels shall be securely fastened together with $\frac{3}{8}$ " 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 $\frac{1}{2}$ " 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.
- G. Containment: The curb is to be 4" wide and 6" high, steel reinforced, monolithically poured and bonded to the floor slab using E-Bond 580 epoxy to monolithically bond the curbing to the floor slab. Curbing to be in a pattern that will create individual cells with interconnecting, cast in place, spillways between cells.

Capacity: Model 10 x 12-HM	(20) 55 Gallon Drums
Model 12 x 16-HM	(36) 55 Gallon Drums
Model 12 x 20-HM	(45) 55 Gallon Drums
- H. Grating System: One inch thick floor grating to be furnished to cover entire containment floor system, providing 250 PSI loading on grating. Grating is in sections to facilitate removal for cleanup. Customer may select between fiberglass and steel grating.
 - a. Chemical Resistant Grating: Shall be fiberglass roving reinforced thermoset plastic, single piece molded construction. Angular silica particles shall be integrally embedded in the top surface of the grating as an anti-slip surface. Non-conductive, and non-magnetic.

- b. Steel Grating: Shall be welded 1/8" bar grating with 1/8" banding of each panel with prime coat finish.
- I. Containment Coatings: CIBA-GEIGY GY9513 or Equal. Chemical, abrasion resistant, solvent free epoxy lining shall be applied to all exposed surfaces of containment area. Custom coating or customer's specification available at custom pricing.

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 (Option): Additional finishes are available and will vary by local producer.

2.04 OPTION SPECIFICATIONS

- A. Explosion Relief Panels: Airolite # 633A-P with Kynar 500 standard color finish, 16 ga. galvanized steel, or equal. One panel to be added to each fusible link vent.
- B. Explosion Proof Electrical System: Electrical panel, 60 AMP, Single Phase, 220 Volt. Two (2) circuit weatherproof with two (2) 20A, 110 volt breakers. One (1) used for 110 volt, 300 watt incandescent light and one (1) used for 110 volt alarm system power. Explosion proof conduit system. Explosion proof incandescent 300 watt ceiling mounted light fixture switching with above mentioned breaker.
- C. Static Grounding System: Grounding lead to exterior driven ground rod, rod furnished with system, to be installed by owner or contractor. The Halo grounding system will consist of a continuous loop of #2 AWG bare stranded or solid wire secured to the perimeter of the interior of the building at a level approximately midway up the wall. Exterior ground drops shall consist of #2 AWG bare ground wires penetrating the building walls. Interior ground drops shall consist of 6'-0" pieces of 1/8" (#2 AWG) stranded or solid wire permanently attached to the Halo ring with S.R. Browne RBE-960 heavy duty plier-type hand clamps or equal at the free ends. (36) tabs at the 18" c.c. will be provided on the ground cable for customer relocation of the pigtails if needed.
- D. Basic Alarm System with Smoke Detector: Simplex 4001 series with water proof cabinet mounted adjacent to power panel. Audible alarm Simplex 2901-9838 with weather proof surface. Visual alarm Simplex weatherproof beacon. Smoke detector Model 30-3003 explosion proof or equal.
 - 1. Flame detector addition to above alarm system, Pyrotector explosion proof detector #30-2021E, or equal.
 - 2. Heat detector addition to above alarm system, Simplex explosion proof detector # 2098-9430, or equal.
 - 3. Spill detector addition to above alarm system, Flotect or equal. One (1) spill detector required per containment cell.
- E. Dry Chemical Fire Suppression System: Ansul SPA-50 pre-engineered system or equal. Three (3) component system consisting of electronic detection and control, agent storage tank and actuator, agent distribution network. Optional methods of actuation are available including manual / electric and pull stations with pneumatic cartridge.
- F. Optional Explosion proof thru the wall heat pump / AC 12,000 BTU cooling /12,500 BTU heating. Climate control model #RHPX12-2.

PART 3 – EXECUTION

3.01 SITE PREPARATION REQUIREMENTS (**MANUFACTURER'S RECOMMENDATION**)

- A. EASI-SET® 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 $\frac{3}{8}$ " or smaller and must be screeded level within $\frac{1}{4}$ " 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.