

Easi-Span™ Precast Concrete Restroom Buildings

Field Assembled

Section 13120

PART 1 – GENERAL

1.01 SUMMARY

Contractor to furnish a precast concrete building. Building to be field assembled by manufacturer on contractor's poured-in-place foundation, or precast floor panels as indicated on contract drawings. Precast building to be Easi-Span™ brand 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-Span™ building will be allowed unless pre-approved by the owner 10 days prior to the bid date.

1.03 DESIGN REQUIREMENTS

- A. Dimensions: If the size building you require differs from the specifications below, please see "Instructions for Modification to Easi-Span™ Building Specifications" to properly adjust the building's specifications to fit your needs.

Exterior: 20' x 20' x 10'-5"

Interior: 19'-4" x 19'-4" x 9' 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 (if precast floor provided by building manufacturer)
4. Standard Wind Loading – 130 MPH

C. Roof: Roof panel shall have a minimum of 8" slope from peak to edge. The roof shall extend 4" beyond the wall panel and have a turndown design which extends ½" 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.

1. Option: If indicated on contract drawings, building can be made expandable with a removable ribbed fascia panel. 20'-0" wall and roof must have lugs to allow post-tensioning of additional modules onto existing structure without removing roof. Roof slabs must be designed to span 20'-0" of free area without internal support for intermediate modules without end walls.

D. Keyway Roof Joints: Grout in keyways shall be polymer concrete placed after coating keyways with a methyl methacrylate resin and isocyanate resin. Top of keyway must be coated with primer followed by one coat of a polymeric joint sealant followed by a fiberglass resin fabric followed by a second coat of polymeric joint sealant.

E. Floor panel or contractor supplied P.I.P slab must have a ½" step-down around the entire perimeter to prevent water migration into the building along the bottom of wall panels.

F. Plumbing shall be designed in accordance with the International Plumbing Code.

G. Electrical system shall be designed in accordance with the International Electric Code.

H. Accessibility

1. Prefabricated flush toilet buildings shall conform to the requirements of the "Uniform Federal Accessibility Standards" (UFAS) and the "Americans with Disabilities Act Accessibility Guidelines" (ADAAG).
2. Buildings shall have full 60-inch turning diameter in each interior and entry area.

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: Roof and floor (if required) shall be post-tensioned in field after grout keyway is filled and has cured to required PSI strength. Post-tensioning cable shall be 41K polys-trand CP50, .50", 270 KSI, 7-wire strand, enclosed within a greased plastic sheath (ASTM A416). There will be a minimum of three post-tensioning cables connecting roofs and floors together to provide a watertight joint.
- D. Caulking: All joints between panels 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. Panel Connections: All panels shall be securely fastened together 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 bolted 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 CECO 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.

PART 3 – EXECUTION

3.01 SITE PREPARATION REQUIREMENTS (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, with a 1/2" step-down along the perimeter edge.

3.02 SITE PREPARATION (Field assembled on precast floor system)

- A. Easi-Span™ 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 sub grade. 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 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, pad, or slab as required.

3.02 ACCESS

- A. 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.

PART 4 - PLUMBING

- A. Waste and vent piping: ABS or PVC plastic.
- B. Water piping: Copper tubing Type L, hard drawn. Provide a gate or ball valve at the inlet end of the water line. Size water lines to provide proper flushing action based on a nominal water pressure of 40 psi.
- C. Provide a main shut-off valve and drain in the service area.
- D. Toilet (water closet) and seat and urinal (if provided): Type 304 stainless steel, wall hung, with siphon jet action. Provide back spud for concealed flush valve connection.
- E. Flush valve: Concealed closet flush-o-meter constructed of rough brass with water saver flow of 1.6 gallons per flush. Furnish valve with integral vacuum breaker and wall mounted push button.
- F. Lavatory: Type 304 stainless steel, 20 inches wide x 18 inches front to back x 6 inches deep.
- G. Faucet: Self-closing water set with indexed push button.
- H. Hose bib: Provide single unit in the service area.
- I. Floor drains: Provide a floor drain in each room of the toilet building.

PART 5 - GRAB BARS

- A. Stainless steel tubing, 1-1/2 inch outside diameter mounted 1-1/2 inches from wall, 18 gauge, type 304 Stainless steel concealed screw-mounting flanges, Bobrick series B-6806, 888-610-8889, or approved equal.

PART 6 - TOILET PAPER DISPENSER

- A. Bar-type toilet paper dispenser shall be constructed of stainless steel with satin finish or steel with glossy white enamel finish with neoprene sleeve, designed to hold three standard rolls of toilet paper. Holder shall not prevent the free turning of the paper rolls. The dispenser shall be manufactured by Romtec Inc., 18240 N. Bank Road, Roseburg, Oregon 97470, 541-496-3541 or approved equal.

PART 7 - ELECTRICAL

- A. Provide a 100-amp breaker panel in the service area.
- B. Wire: Copper.
- C. Light fixtures:
 - 1. Service area: 2 each, 4-foot ceiling mounted fluorescent, switch and motion detector controlled.
 - 2. Toilet rooms: Motion detector that activates fluorescent fixtures in service area.
 - 3. Outdoor: 35-watt high-pressure sodium, cast aluminum case, rated for outdoor use, photocell activated.
 - 4. Hand dryer: Air compression type with remote motor unit. Push button switch located in cast nozzle housing with flexible hose connecting blower motor, housing and nozzle. Power input 120VAC, 7A (non-heated air).

INSTALLATION OF PRECAST CONCRETE TOILET AND UTILITY BUILDINGS

PART 1 – GENERAL

A. Description

- 1. The work of this section consists of installing precast concrete toilet and utility buildings including clearing and grubbing, excavating, backfilling, site grading and cleanup.

B. Quality Assurance

- 1. Ensure that water on the floor slab drains towards the door.

C. Flush Toilet

- 1. All plumbing and electrical connections shall be made by licensed plumbers and electricians in the state where the building is installed.

D. Toilet Building Accessibility

2. Ensure that paths within 50 feet of the toilet building are accessible and meet ADA requirements.

E. Submittals

1. Certification from supplier that bedding material meets the gradation specified.
2. If blasting is required for excavation, submit blasting plan.
3. Building installation manual.

F. Delivery and Handling

1. Contractor shall coordinate with the building manufacturer for the delivery and placement of the precast concrete building. Refer to Sections 13120, 13121 or 13122.
2. The Ordering Unit Contracting Officer shall provide detailed directions and a map for each delivery site.
3. Roads and bridges shall be rated for highway loads along the access route. The Ordering Unit Contracting Officer shall verify that the delivery site is accessible by trucks (18-wheeler) with a 48 ft. trailer. If the delivery site is inaccessible the Contractor shall coordinate with the Ordering Unit Contracting Officer for delivery. The Government will pay additional costs.
4. Building shall be installed according to the manufacturer's installation instructions.

PART 2 – PRODUCTS

A. Soil Classification

1. Excavation shall be unclassified as to materials and shall include all materials that are encountered in the required excavation.

B. Backfill Material

1. Backfill material shall be sandy clay, sand, gravel, soft shale, or other suitable material free from brush, organic material, dirt clods, stone or boulders larger than six inches in greatest dimension or frozen material.
2. Backfill within six inches of concrete shall contain no stone larger than two inches and no stone two inches or larger shall lie closer than six inches to the ground surface.
3. Backfill material shall be excavated material whenever it meets specification requirements. Whenever excavated material contains less than 10 percent of oversized material, the Contractor shall remove boulders larger than 6" from the excavated material at no additional compensation and utilize it as backfill material. Whenever material meeting the specification requirements is not available from excavation, the Contractor shall import material from a designated or approved source.

C. Select borrow

1. When excavated soil does not meet the requirements for backfill, Contractor shall backfill with select borrow obtained from a source identified by the Ordering Unit Contracting Officer.

D. Bedding material

1. Bedding material shall be washed sand or 3/8" minus crushed or screened aggregate from a private or commercial source. Sand or aggregate shall be used as a leveling course beneath the concrete vault or slab.

E. Accessible path surfacing

1. The Government will provide granular surface material for placement by the Contractor within 50 feet of the building.

F. Sealant

1. For vault toilet buildings, use 100% silicone caulk, clear for vent pipe and toilet riser. GE Silicone II, 800-626-2000, or approved equal.

PART 3 - EXECUTION

A. Staking

1. The Contractor will establish the finish floor elevation and approximate corners of the building prior to the Contractor beginning work.

B. Clearing and Grubbing

1. Clearing and grubbing shall be confined to designated areas and only marked trees may be removed. Maximum clearing and grubbing shall be confined to an area 20 feet beyond the back and sides of the building and 30 feet in front of the building. Construction work shall disturb a minimum of the existing terrain and plant life adjacent to the cleared and grubbed area. The Contractor shall exercise care to not damage unmarked trees and shrubbery. Skinned or barked trees shall be repaired with an application of black asphalt emulsion especially formulated for such use.
2. Trees shall be felled within the clearing limits, usually towards the center, so as to prevent damage to the trees that are to be left standing. When necessary to prevent damage to structures, adjacent trees, property, or to minimize danger to traffic, trees shall be cut in sections from the top downward.
3. All trimming of trees shall be done in accordance with approved horticultural practices. Branches shall be saw cut flush with the trunk. Stumps within the clearing limit but out of the excavation area shall be cut not more than 6 inches above the ground.

4. Trees and limbs larger than 4 inches in diameter shall be cut in 8-foot lengths and stockpiled as directed by the Ordering Unit Contracting Officer.

C. Topsoil

1. Topsoil shall be removed from the area to be excavated and from the area where excavated material shall be piled prior to excavating. Topsoil shall be kept separate from excavated material. Topsoil shall be reused on those areas from which it came after backfilling is complete.

D. Safety, Shoring, and Protection

1. The Contractor shall meet OSHA safety rules and regulations. Walls of excavations 4' or more in depth shall be supported by bracing, shoring, or other methods, unless the walls are sloped to a safe angle from the bottom. If shored, the excavation shall be of proper dimensions to accommodate shoring and bracing, as required to keep walls from collapsing and to allow for proper installation of the work. All existing improvements, either on public or private property, shall be fully protected from damage. All supports shall be removed after construction is completed, and shall be withdrawn in a manner that will prevent the collapse of the sides of the excavation. All openings in the ground, caused by the removal of supports, shall be filled with suitable material properly compacted.
2. All excavations left open overnight shall be fenced with wire or plastic mesh secured to steel posts all around the excavation.
3. The bottom of the fence shall follow the contour of the ground
4. Maximum spacing of the steel posts shall be 10 feet.
5. Minimum height of the fence shall be 36 inches.

E. Removal of Water

1. The Contractor shall provide and maintain, at all times during construction, ample means and devices with which to promptly remove and properly dispose of all water entering the excavations or other parts of the work without damage to adjacent property. All excavations shall be kept free from standing water. The Contractor at his own expense shall repair any damage caused by water in the excavation.

F. Excavation, backfill, and site grading

1. Coordination with the Building Manufacturer: Contractor shall coordinate with the manufacturer of the precast concrete building to accommodate installation at the time of delivery. The Contractor shall be responsible to obtain installation instructions from the manufacturer and perform the excavation, backfill, and site grading in accordance with those instructions. The excavation shall be over excavated two feet (horizontal measurement) on each side of the vault or slab to allow for compaction and minor adjustments in orientation. The Contractor must have excavation complete prior to delivery of the precast concrete building. The Contractor will be provided 1-week minimum lead-time

to have the excavation work performed. Also, the Contractor must be on site at the time of delivery to perform the backfill operation as soon as the precast concrete building is in place.

G. Excavation

1. Excavation shall be performed by any method approved by the Ordering Unit Contracting Officer. Stockpile excavated material away from the excavation to facilitate crane and delivery truck access. The crane and delivery truck typically need to be side-to-side during placement.
2. Compact the natural ground at the bottom of the vault excavation with a minimum of three passes with an approved whacker-type mechanical tamper.

H. Bedding

- a. The Contractor shall place a leveling course prior to placement of the vault or building.
- b. Compact leveling course with one pass of an approved whacker-type mechanical tamper.
- c. Grade leveling course so there will be no high spots in the middle.
- d. Compact with a second pass with a tamper. Slope the top of the bedding one percent from back to front of building.
- e. Minimum compacted leveling course for vault shall be 4 inches.
- f. Minimum compacted leveling course for building slab shall be 6 inches.

Building Placement

Refer to Section 13120, 13121 or 13122.

I. Backfill

1. Backfill shall be permitted only after the work to be covered has been approved by the Ordering Unit Contracting Officer. Backfill shall be placed in 8" thick (loose measurement) lifts and compacted with three complete passes of an approved vibratory compactor.

J. Start-up procedures

1. Vault Toilet: Vault Preparation
 - a. Add approximately 80 gallons of potable water to cover the floor of the vault(s).
2. Vent Pipe Installation

- a. Install vent pipe plumb and seal around pipe at top and underside of roof with silicone sealant.
 - b. Seal around pipe at top of slab with silicone sealant.
3. Toilet Riser Installation
 - a. Apply silicone sealant between toilet riser flange and concrete floor before the riser is installed.
 4. Flush Toilet: Plumbing Connection
 - a. Make connections to water and sewer lines in accordance with manufacturer's instructions.
 5. Electrical Connection
 - a. Make connection to electrical service in accordance with manufacturer's instructions.

K. Finish grading

1. All surfaces and slopes shall be shaped to blend with the original ground line, mounded over or smoothed off, and raked, and left in a uniform and neat condition. Stockpiled topsoil shall be smoothly distributed over disturbed areas and hand raked to blend with ground line. Final grade shall be flush with top of front slab to provide accessibility. Surface drainage shall be diverted so that it will not enter into the area.
2. The surface of accessible paths within 50 feet of the building shall be compacted with 3 passes of a vibratory compactor prior to placement of Government furnished granular material. Place granular surface material and compact with 3 passes of a vibratory compactor, wetting the material between passes.

L. Cleanup

1. After backfilling and grading has been completed, the disturbed area shall be finished to present as near a natural appearance as possible and cleaned up by removing all debris and materials not utilized.

M. Disposal

1. All unsuitable excavated material, oversize boulders, stumps, small limbs, brush, sod and other construction refuse shall be disposed of off-site at a State-approved disposal site.