SECTION 13 34 00
FABRICATED PRE-ENGINEERED PRECAST CONCRETE STRUCTURES

40’ x 40’ PRECAST CONCRETE BUILDING
EASI-SPAN® FIELD ASSEMBLED

SECTION 1 – GENERAL

1.1 WORK INCLUDED

Contractor to furnish a precast concrete building to be field assembled by manufacturer on contractor’s cast-in-place foundation, or precast floor panels as indicated on contract plans and in accordance with manufacturer’s recommendations. Precast building to be EASI-SPAN® brand Model 4040 as manufactured by a *licensed producer of Easi-Set Buildings.* Building shall be provided by manufacturer with all necessary openings as specified by contractor in conformance with manufacturer’s structural requirements.

1.2 REFERENCES

A. ACI-318 – Current Edition: Building Code Requirements for Structural Concrete and Commentary

B. ASCE/SEI – Current Edition: Minimum Design Loads for Buildings and Other Structures

C. IBC – Current Edition: International Building Code

D. PCI Design Handbook – Current Edition

E. Concrete Reinforcing Institute, Manual of Standard Practice

F. UL-752 (Test Method level 5) for bullet resistance certified by a military approved laboratory.

1.3 SYSTEM DESCRIPTION

DESIGN REQUIREMENTS

A. Building Dimensions:

Exterior: 40’ x 40’ x 11’-0” (Not including floor)

Interior: 39’-4” x 39’-4” x 10’ 0”

Design case to be selected to correspond to the design criteria indicated in the aforementioned codes for the geographical location of the project or as specified.

CASE 1: Typical

B. Design Loads:

1. Seismic Design Category ‘C’, Risk Design Category II
2. Roof Live Load (Snow) – 30 PSF
3. Floor Live Load – 150 PSF (if precast floor is provided)

4. Wind Loading* – 115 MPH

*Design loads relate to precast components only, not accessories (i.e. doors, windows, vents, etc.)

CASE 2: Heavy

C. Design Loads:

1. Seismic Design Category 'D', Risk Design Category III
2. Roof Live Load (Snow) – 60 PSF
3. Floor Live Load – 250 PSF (if precast floor is provided)
4. Wind Loading* – 165 MPH

*Design loads relate to precast components only, not accessories (i.e. doors, windows, vents, etc.)

D. Roof: Roof panel shall have a minimum of 6" slope from peak to edge. The roof shall extend 4" beyond the wall panel and have a turndown design which extends ½" minimum below the top edge of the wall panels to prevent water migration into the building along top of wall panels. Optional roof with an integral architectural ribbed edge (only available from certain Easi-Set licensed producers).

1. Option: If indicated on contract drawings, building can be made expandable with a removable ribbed fascia panel. 40'-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 40'-0" of free area without internal support for intermediate modules without end walls.

E. Roof Joint Keyway: Grout in keyways shall be a magnesium phosphate material or equal, prepared and placed per the manufacturer's recommendations. Apply a polysulfide, elastomeric joint sealant to the top of the grouted keyway, installed per manufacture's recommendations.

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

1.4 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.

B. Manufacturers' product literature shall be provided for any plumbing, electrical, and miscellaneous installed fixtures demonstrating compliance with these specifications.

1.5 QUALITY ASSURANCE

A. The precast concrete building producer shall be a plant-certified member of either the National Precast Concrete Association (NPCA), The Precast/Prestressed Concrete Institute (PCI), or equal.

B. The precast concrete building producer shall demonstrate product knowledge and must have a minimum of 5 years experience manufacturing and setting precast concrete.

C. The manufacturer must be a licensed producer of Easi-Set Buildings

D. 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.

SECTION 2 – PRODUCTS

2.1 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.
Welded Wire Fabric: ASTM 185, Grade 65

C. Post-tensioning Strand: Roof and floor (if required) sections shall be post-tensioned in the field after grout keyway is filled and has cured to the required PSI strength. Post-tensioning strand shall be 41K Polystrand CP50, ½" 270 KSI Seven-Wire strand, enclosed within a greased plastic sheath (ASTM A416). There will be a minimum of three transverse post-tensioning cables connecting roof and floor (if provided) sections together to provide a watertight joint. To ensure a watertight design, no alternate methods shall be substituted for the post-tensioning.

If Precast floors are provided, each shall be post-tensioned by a proprietary, second generation design using a single, continuous tendon. Said tendon is placed in the concrete slab to form a perimeter loop starting from one corner of the slab to a point where the cable entered the slab. The tendon then turns 90 degrees and follows the cable member(s) in the periphery to a point midway along the "X" axis of the concrete building panel and then turns 90 degrees along the "Y" 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. This creates a cable pattern with no less than 2.5 parallel cables in any direction. To ensure a watertight design, no alternate methods shall be substituted for the post-tensioning.

D. Caulking: All joints between panels shall be caulked on the exterior and interior surface of the joints. Caulking shall be DOW CORNING 790 silicone sealant or equal. Exterior caulk reveal to be 3/8" x 3/4" deep so that sides of joint are parallel for proper caulk adhesion. Back of the 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 A36 and hot dipped galvanized after fabrication. All fasteners to be ½" diameter bolts complying with ASTM A325 for carbon steel bolts. Cast-in anchors used for panel connections to be Dayton-Superior F-63 coil inserts, 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 cast-in-place floor slab using expansion anchors providing adequate embedment by manufacturer.

2.2 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. All door and frame galvanizing shall be in accordance with ASTM A924 and A653, A60 minimum coating thickness.

a. The buildings shall be equipped with double 3'-0" x 6'-8" x 1-3/4" thick insulated, 18 gauge, metal doors with 16-gauge frames (to meet wall thickness). Doors to have flush top cap. 12 gauge flat astragals shall be applied to the active leaf to protect against the elements or forced opening. Doors and frames shall be factory bonderized and painted with one coat of rust inhibitive primer and one finish coat of enamel paint; color to be BOLT BROWN unless specified otherwise.
b. Doors and frames shall meet SDI standard Level 2, 1¾" heavy duty.
Approved manufacturers: Republic, Steelcraft, Ceco, Black Mountain, Pioneer, Curries, Mesker, MPI, Door components or equal
Approved distributor: Integrated Entry Systems

B. Door Hardware:

1. Pull Handle: Shall meet requirements of ANSI A156.2. Shall be thru bolt attached and constructed of a minimum ¾" diameter stainless pull handle sized 8" center to center with a stainless backer plate, minimum 0.053" on both sides.
Approved manufacturers: Design Hardware, Don-Jo, or equal

2. Hinges: Shall comply with ANSI A156.1 and be of the ball bearing, non-removable pin type (3 per door minimum). Hinges shall be 4 ½" x 4 ½" US26D (652) brushed chrome finish. Manufacturer shall provide a lifetime limited warranty.
Approved manufacturers: Design Hardware, or equal

3. Deadbolt: Commercial Grade Deadbolt conforming to ANSI 156.5 furnished with a 2 ¼" face plate and a 1" projecting deadbolt with hardened steel pins. Dead bolts shall be UL and ADA approved. Finish shall be US26D (626) brushed chrome finish. Manufacturer shall provide a lifetime limited warranty.
Approved manufacturers: Design Hardware, Dorma, or equal

4. Surface Bolt: 8" Surface bolt UL listed. Finish US26D (626) brushed chrome finish. (2 per inactive leaf)
Approved manufacturers: Don-Jo, Design Hardware, or equal

6. Threshold: Bumper Seal type threshold with a maximum 1" rise to prevent water intrusion. Thresholds shall be approved for UL 10B suitable for use with fire doors rated up to three hours.
Approved manufacturers: National Guard Products or equal

7. Overhead Door Holder: Heavy duty surface mounted hold open device with hold open/stop angle of 85 to 110 degrees. Construction shall be stainless steel. Finish US32D (630) satin stainless steel finish.
Approved manufacturers: ABH, Rockwood, or equal

8. Drip Cap: Aluminum drip cap with minimum projection of 2 ½" shall be furnished.
Approved Manufacturers: Design Hardware, National Guard Products, or equal

9. Door Stop: ANSI 156.16 approved wall mounted door stop with keeper constructed of a corrosion resistant cast brass material. Finish US26D (626) brushed chrome finish.
Approved manufacturers: Don-Jo, Rockwood, or equal

2.3 FINISHES

A. Interior of Building: Smooth form finish on all interior panel surfaces unless exterior finish is produced using a form liner, then smooth hand-troweled.

B. Exterior of Building: (Standard) 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 water-based acrylic, water repellent penetrating concrete stain: 1) Canyon Tone stain by United Coatings, 2) Sherwin Williams (H&C concrete stain) or equal. Stain shall be applied per manufacturer's recommendation. Joints shall be kept substantially free of stain to maintain a gray concrete color. Stain color shall be BRICK RED unless specified otherwise.

C. Exterior of Building (Option #1): Washed brown riverstone applied-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".

D. Exterior of Building (Option #2): Additional finishes are available and will vary by local producer.

SECTION 3 – EXECUTION

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

Work under this section relates to installation of the building by Easi-Set licensed producer on the customer's prepared foundation and site.

A. Slab on grade (designed by others) 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 slab must have a ½" step-down around the entire perimeter to prevent water migration into the building along the bottom of wall panels.

OR

3.2 SITE PREPARATION RECOMMENDATION (Field assembled on precast floor system)

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 and 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 ¼" 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 a concrete slab, substrate below pavement or slab must have a vertical soil capacity of 1,500 pounds per square foot. Ensure bearing surface for building is flat and level. As required, place adequate material (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.

3.2 SITE 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; 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 unless specifically permitted.