1.0 SUBJECT

Engineer, fabricate and install ***MSC*** precast concrete panels to withstand design loads within limits and under conditions indicated. Panel design shall conform with ICBO ER-5446 and meet the requirements of the current Uniform Building Code.

1.1 GENERAL

A. **System Description**:

1. ***MSC*** precast panel fabrication shall include all labor, materials and equipment necessary to manufacture the panels as shown by the Contract Documents.
2. ***MSC*** precast panel installation shall include all labor, materials and equipment necessary for the installation of panels as shown by the Contract Documents.
3. The ***MSC*** composite panels consist of light-gauge steel studs and a reinforced concrete facing or topping on one side of the studs, with the ***MSC*** metal connector providing a shear-flow connection between the steel studs and the concrete. ***MSC*** is a patented ICBO approved steel connector strip used to transfer shear stresses in composite wall panel systems.
4. The Precast Manufacturer shall furnish all precast connection hardware embedded in the panels. The furnishing and placement of the hardware in the cast-in-place (i.e., slab, footings) concrete will be the responsibility of the General Contractor.
5. Items and openings which are to be cast into the ***MSC*** precast panels for other trades shall be provided to the Precast Manufacturer, with instructions, in a timely manner in order not to disrupt or delay production. All such embeds, hardware and exact location of same shall be fully defined in contract drawings.

B. **Engineering Responsibility**: A qualified professional engineer shall prepare design calculations and other structural data for ***MSC*** precast concrete units.

C. **Submittals**: In addition to product data, manufacturer's instructions, concrete mix designs, material test reports, and material certificates, submit the following:

1. Samples:
   a. Submit preliminary sample, approximately 12" x 12", representative of finished exposed face.
   b. Prior to commence-ment of manufacture, submit production sample, approximately 4' x 4', for final approval of color and texture.
3. Shop and Erection Drawings: Submit one (1) reproducible set and three (3) blueline sets showing:
   a. Material specifications
   b. Floor plan identifying location of panels.
   c. Floor plan identifying location of pre-erection attachments (i.e., cast-in-place embeds and pre-welds) to support structure (if applicable).
   d. Elevations identifying location of panels and their connections.

e. Details as necessary to describe relationship of panels to adjacent material.
f. Details of panel connections.
g. Description of all hardware cast into panels, sent loose to the job site, and cast into or attached to supporting structure (if applicable).
h. Elevations and sections of typical panels showing:
(1) Geometry and finish
(2) Thickness of face
(3) Reinforcement material and layout
(4) Lifting and erection hardware sizes and locations
(5) Embeds with piece marks and their locations (if applicable)

4. Mix Designs: Submit all precast mix designs for approval. Mix designs shall be prepared by a qualified employee of the Precast Manufacturer or concrete supplier.

D. **Fabricator Qualifications**: Regularly engaged for at least five (5) years in fabrication of precast panels similar to those required on this project.

E. **Professional Engineer Qualifications**: A professional engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of precast concrete units that are similar to that indicated for this Project in material, design and extent.

F. **Quality Assurance**:
1. Full-Scale Panel:
a. After standard samples are accepted for color and texture, product full-scale panel meeting design requirements. This panel shall be viewed and approved by the Architect at the precast location.
b. The full-scale panel shall be representative of standard quality for precast panel work, when accepted by Architect.
c. Incorporate full-scale panel into work after keeping panel at precast location for checking purposes.

1.2 MATERIALS

A. **Steel Studs**: Where the ***MSC*** connector is used, steel studs in composite panels must be recognized in a current ICBO ES evaluation report. Physical and section properties are found in the evaluation report on the steel stud. Minimum steel thickness and yield strength for the studs must comply with Table 1 of ICBO ER-5446.

B. ***MSC* Connector**: The ***MSC*** connector transfers shear stresses between the concrete facing and the light-gauge steel stud. The strip is fastened to the web of the stud and the flange of the track. The strip connector with stud frame attached is then embedded into the concrete facing.

The strip is fabricated from No. 18 gauge thick (0.047 inch [1.19 mm]) steel, complying either with ASTM A 653, Grade 33, or with SAM A 570, Grade 33. The galvanized coating complies with ASTM A 924.

C. **Concrete**: The concrete facing or topping is normal-weight concrete having a minimum compressive strength of 2,500 pounds per square inch (17.2 Mpa) at 28 days. Concrete materials must comply with Section 1903 of the Code.

D. **Steel Reinforcement**: Concrete panels must be reinforced in accordance with the structural design, and the steel reinforcement must comply with the Code.

E. **Screws**: The ***MSC*** connector must be attached to the stud using galvanized tek type self-drilling, self-tapping sheet metal screws of a manufacturer or brand recognized in a current ICBO ES report. The screws must comply with the standards for the allowable pullout and shear loads described in those reports. The design engineer shall calculate the shear, pullout and tension requirements and select a screw that has confirmed the capacity for those values.

1.3 FABRICATION

A. Precast Manufacturer shall not proceed with fabrication of panels prior to receiving the approved set of Shop Drawings and the Architect's acceptance of submitted Samples.

B. Batching of Concrete shall be in accordance with approved Mix Design(s).

C. **Forms**:
1. Forms for precast panels shall be rigid and constructed of materials that will result in finished products conforming to the profiles, dimensions and tolerances indicated by this Section, the Contract Documents and the reviewed Shop Drawings.
2. Construct forms to withstand vibration method selected.
3. Release agents shall be applied and used according to manufacturer's instructions.

D. **Concreting**:
1. Convey concrete from the mixer to place of final deposit by methods, which will prevent separation, segregation or loss of material.
2. Consolidate all concrete in the form to minimize unintentional pour lines, honeycombing or entrapped air on vertical surfaces.

E. **Curing**: Procedures sufficient to insure specified concrete strength of all precast panels must be employed. Stripping of a panel shall not occur until concrete strength is sufficient to prevent cracking or breaking of the panel.

F. **Manufacturing Tolerances**:
1. Overall height width of panels measured at the face exposed to view:
    a. 10' or less: ±1/8"
    b. 10' to 20': +1/8",-3/16"
    c. 20' to 40': ±1/4"
    d. Each add'l 10': ±1/16"
2. Overall height and width of panels measured at the face not exposed to view:
    a. 10' or less: ±1/4"
    b. 10' to 20': =1/4",-3/8"
    c. 20' to 40': ±3/8"
    d. Each add'l 10': ±1/8"

3. Variation from square or designed skew (difference in length of two diagonal measurements): 1/8” per 6’ or 1/2” total, whichever is greater.
4. Bowing: Bowing shall not exceed L/360 unless it can be shown that the member can meet erection tolerances using connection adjustments.
5. Length and width of blockouts and openings within one (1) panel: ±1/4”.
6. Location of window opening within panel: ±1/4”.
7. Location of blockouts other than window openings: ±3/8”.
8. Warpage: Maximum permissible warpage of one corner out of the plane of the other three shall be 1/16” per foot distance from the nearest adjacent corner.
9. Location of bearing connections: ±1/4”.
10. Location of embeds and inserts other than bearing connections: ±1/2”.

G. **Panel Identification**:
1. Mark each precast panel to correspond to identification mark on Shop Drawings for panel location.
2. Mark each precast panel with casting date.

H. **Panel Finish and Approval**: Precast panels and approved Samples shall be viewed side by side from a distance of 20’ when comparing texture and color. Precast panels that do not reasonably match the color and texture of the approved sample(s), the dimensional tolerances, or industry standards may be rejected at the option of the Architect if they cannot be satisfactorily corrected.

1.4 EXECUTION

A. **Product Transportation and Handling**:
1. Handle and transport panels in a position consistent with their shape and design in order to avoid excessive stresses or damage.
2. Lift or support panels only at the points shown on the Shop Drawings.
3. Support panels during shipment on non-staining shock-absorbing material as needed to prevent damage.

B. **Pre-Installation Responsibility**:
1. General Contractor’s Responsibility:
   a. The General Contractor shall provide the control layout grid lines, including grades, at each building elevation on each floor receiving precast panels.
   b. The General Contractor shall provide true, level, and clean support and attachment surfaces.
   c. The General Contractor shall provide for the accurate (± 1/2” in all directions) placement and alignment of connection hardware on the structure.
   d. The General Contractor shall confirm that the dimensions and tolerances of the structure allows for proper installation of the precast panels.
2. Erector’s Responsibility: Prior to installation of the precast panels, notify the General Contractor of any discrepancies discovered which affect the work under this Contract. Commencement of installation does not constitute acceptance of the structure.

C. **Erection**:

1. Unloading Areas and Access: Clear all-weather unloading areas and access roadways around the building and in the building (where appropriate) shall be provided and maintained by the General Contractor so that the hauling and erection equipment for the precast panels may operate under their own power.
2. Safety Aspects: The General Contractor shall provide all required traffic controls, barricades, warning lights and/or signs to insure a safe installation.
3. Setting: Precast panels shall be lifted with suitable lifting devices at points provided by the Precast Manufacturer to prevent excessive stresses or damage to the panels.
4. Temporary Supports and Bracing: The erector shall provide temporary supports and bracing as required to maintain position, stability and alignment until panels are permanently connected.
5. Tolerances of Erected Panels shall be as listed below:
   a. Plant location from building grid datum: ±1/2”
   b. Top elevation from nominal top elevation:
      (1) Exposed individual panel: ±1/4”
      (2) Non-exposed individual panel: ±1/2”
      (3) Exposed relative to adjacent panel: 1/4”
      (4) Non-exposed relative to adjacent panel: 1/2”
   c. Maximum plumb variation over height of structure or 100 feet, whichever is less: 1”
   d. Plumb in any 10 ft. of element height: 1/4”
   e. Maximum jog in alignment of matching edges: 1/4”
   f. Joint width (governs over joint taper):
      (1) Panel dimension less than 20’: ±1/4”
      (2) Panel dimension over 20’: ±3/8”
   g. Joint taper maximum: 3/8”
   h. Joint taper in 10 ft: 1/4”
   i. Maximum jog in alignment of matching faces: 1/4”
   j. Differential bowing as erected between adjacent member of same design: 1/4”
6. Final Connection of Panels to Structure:
   a. Precast panels shall be attached to the structure as shown on the reviewed Shop Drawings.
   b. All modifications made to details shown on Shop Drawings shall be submitted for review.

D. **Job site Storage, Handling and Protection**:

1. Erector shall be responsible for the repair of damage to precast panels that is caused by its own crew.
2. After precast panels are installed in their final positions, the General Contractor shall be responsible for their protection.
3. The General Contractor shall be responsible for the repair of any damage to the precast panels caused by someone other than the Precast Manufacturer.

E. **Patches and Repairs**:

1. Patching of panels, when required, shall be performed to the Architect’s satisfaction and consistent with industry standards.

2. Repairs shall be sound, permanent and flush with adjacent surface.
3. From a distance of 20' all repairs must be of color and texture matching adjoining surfaces and showing no apparent line of demarcation between original and repaired work.

F. **Cleaning**:
1. Cleaning methods shall be approved by Precast Manufacturer.
2. Erector shall clean erection marks from precast panels upon erection, when exposed to view.
3. Use care to prevent damage to precast surfaces and to adjacent materials.
4. Surface must be thoroughly rinsed with clean water immediately after using cleaner.
5. At completion of the project, General Contractor shall be responsible for final cleaning and wash down of building.

G. **Sealer and/or Anti-Graffiti (where used)**:
1. Seal exposed precast surfaces, where indicated on Contract Drawings, with one (1) coat of water repellant coating in accordance with product manufacturer's recommendations.
2. Surfaces to be free of dirt, dust and other foreign material immediately prior to sealer application. Precast Manufacturer, at his option, may factory apply sealer.
3. Patches or other work on panel surfaces, which have removed sealer, shall be resealed by the responsible party.

H. **Inspection and Acceptance**: Immediately after erection is completed, final inspection and acceptance of the erected precast panels shall be made by the Architect and General Contractor to verify conformance with plans and specifications. In cases where precast panel installation is phased, panels shall be inspected and approved in phases.

I. **Warranty**: All labor and materials under the Precast Manufacturer's Contract shall be warranted by the Precast Manufacturer for a period of one (1) year following final approval of the precast panel by the Architect.

*** END SECTION ***

COMPOSITE SYSTEMS
6232 Santos Diaz Street, Pasadena, California 91702-3267
(800) 796-3275
(626) 334-6100 ext 229
FAX (626) 334-6106
www.metalcrete.com
E-Mail: metalcrete@earlcorp.com