SECTION 03 48 33 – Gate Lite
(Gate Precast Co. Composite Light Weight Panel System)

1. GENERAL

1.1 DESCRIPTION

A. Section Includes:
   1. Structural design and detailing of panels (products).
   2. Plant fabrication of Gate Lite panels.
   3. Transportation of Gate Lite panels to jobsite.
   4. Installation (erection) of Gate Lite panels.

B. Related Documents: The requirements of the General Conditions, Supplementary General Conditions, and applicable portions of Division 0 of these Specifications as they apply to this Section.

C. Related Sections:
   1. Section 01 43 40 – Off-Site Mockup Assembly
   2. Section 07 92 00 – Joint Sealers
   3. Section 07 27 03 – Spray Foam (IF APPLICABLE)

1.2 REFERENCES

A. ASCE 7: Minimum Design Loads for Buildings & Other Structures

B. ACI 318: Building Code and Commentary

C. AISC 360: Specification for Structural Steel Buildings

D. PCI MNL-120: PCI Design Handbook, Precast and Prestressed Concrete

E. PCI MNL-117: Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.

F. PCI MNL-116: Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.

G. AWS D1.1: Structural Welding Code - Steel

H. AWS D1.3: Structural Welding Code - Sheet Steel

I. AWS D1.4: Structural Welding Code - Reinforcing Steel

J. ASTM A29: General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought

K. ASTM A36: Carbon Structural Steel

L. ASTM A53: Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless

M. ASTM A108: Steel Bar, Carbon and Alloy, Cold-Finished

N. ASTM A123: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

O. ASTM A153: Zinc Coating (Hot-Dip) on Iron and Steel Hardware

P. ASTM A193: Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications

Q. ASTM A194: Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both

R. ASTM A307: Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength

S. ASTM A325: Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

T. ASTM A449: Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90ksi Minimum Tensile Strength, General Use

U. ASTM A500: Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

V. ASTM A510: General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel

W. ASTM A563: Carbon and Alloy Steel Nuts

X. ASTM A572: High-Strength Low-Alloy Columbium-Vanadium Structural Steel

Y. ASTM A615: Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

Z. ASTM A653: Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

AA. ASTM A706: Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

BB. ASTM A767: Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement

CC. ASTM A775: Epoxy-Coated Steel Reinforcing Bars

DD. ASTM A884: Epoxy-Coated Steel Wire and Welded Wire Reinforcement

EE. ASTM A992: Structural Steel Shapes

FF. ASTM A1003: Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members

GG. ASTM A1011: Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

HH. ASTM A1064: Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

II. ASTM A1085: Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS)

JJ. ASTM B633: Electrodeposited Coatings of Zinc on Iron and Steel

KK. ASTM B766: Electrodeposited Coatings of Cadmium

LL. ASTM C33: Concrete Aggregates

MM. ASTM C150: Portland Cement

NN. ASTM C260: Air-Entraining Admixtures for Concrete

OO. ASTM C494: Chemical Admixtures for Concrete

PP. ASTM C618: Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

QQ. ASTM C979: Pigments for Integrally Colored Concrete

RR. ASTM C1088: Thin Brick Veneer Units Made from Clay or Shale (IF APPLICABLE)

SS. ASTM C1107: Packaged Dry, Hydraulic-Cement Grout (Non-shrink)

TT. ASTM F436: Hardened Steel Washers

UU. ASTM F844: Washers, Steel, Plain (Flat), Unhardened for General Use

VV. ASTM F1554: Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

WW. SAE J429: Mechanical and Material Requirements for Externally Threaded Fasteners

XX. SSPC-Paint 30: Weld-Through Inorganic Zinc Primer

YY. Federal Specifications: DOD-P-21035A & MIL-P-26915

ZZ. NFPA 285: Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components (IF APPLICABLE)

1.3 SYSTEM DESCRIPTION

A. Plant-fabricated Gate Lite panels consisting of a 2¼" thick concrete skin with embedded wire mesh or carbon fiber reinforcement supported on a steel frame via gravity anchors, seismic anchors, and out-of-plane "flex" anchors, steel connections for panel attachment to structure, and other inclusions for attachments to panels. Panels are pre-insulated (IF APPLICALBE) and transported to the job site for installation.

B. Gate Lite panel fabrication shall include all labor, materials, and equipment necessary to manufacture the panels as shown by the Contract Documents.

C. Gate Lite panel installation shall include all labor, materials, and equipment necessary for the installation of the panels as shown by the Contract Documents.

D. The Gate Lite manufacturer (Gate Precast) shall design and furnish all connection hardware to be attached to or embedded in the panels, shall furnish all loose connection hardware, and shall furnish all connection hardware required to be embedded in the cast-in-place concrete for connection of the pan Gate Lite panels. The placement of the hardware in the cast-in-place concrete will be the responsibility of the General Contractor.

E. Hardware which is to be incorporated into the fabrication of the Gate Lite panels for other trades shall be provided to the Gate Lite e manufacturer (Gate Precast), with instructions, in a timely manner in order not to disrupt or delay production. All such hardware shall be fully defined in contract drawings.

F. If applicable, the Structural Engineer of Record shall design the steel preweld required (such as outriggers and downriggers) to carry the loads from the Gate Lite panels to the structure. The prewelds and any additional bracing or stiffening of the structure required to support the loads from the Gate Lite panels shall be by others unless specifically shown on the contract drawings by the Gate Lite Manufacturer.

1.4 QUALIFICATIONS

A. Design: Gate Lite panels shall be designed under the supervision of a Structural engineer registered in the State of Tennessee employed or retained by Gate Precast. All design loads shall meet the requirements of the applicable building code(s).

B. Manufacturing: Gate Precast Company manufacturing plants are certified by the Precast/Prestressed Concrete Institute Plant Certification Program for Group A1.
   1. Gate Precast is the only acceptable manufacturer for this product.

C. Erector: Gate Precast Co. is the only acceptable erector of Gate Lite panels.

D. Welders (Shop, Plant and Field): Welders performing work under this specification shall be qualified in accordance with AWS D1.1, AWS D1.3 and AWS D1.4 as required to perform work at all stages of production and erection.

E. Testing: Gate Lite manufacturer (Gate Precast Co.) shall comply with the testing provisions in MNL-117, Manual for Quality Control of Plants and Production of Architectural Precast Concrete Products.

1.5 SUBMITTALS

A. Submit all information under provisions of Division 0, if any.

B. Samples:
   1. Submit three preliminary samples, approximately 12" by 12", representative of finished exposed face.
   2. Prior to commencement of manufacture, architect to review approximately 4' x 4' sample for final approval of colors and textures.

C. Shop and Erection Drawings: Submit electronic copy (or printed quantity as agreed upon) showing the following;

1. Material specifications
2. Floor plans identifying location of panels
3. Elevations identifying location of panels and their connections
4. Details as necessary to describe relationship of panels to adjacent material
5. Details of panel connections
6. Description of all hardware attached to panel frames, sent loose to the job site, and cast into or attached to supporting structure
7. Elevations and sections of typical panels showing;
    a. geometry and architectural features,
    b. thickness of concrete skin,
    c. steel frame members and dimensions,
    d. size, location, and details of gravity, seismic, and flex anchors,
    e. connection hardware with piece marks and their location on the steel frame

D. Mix Designs: Submit all Gate Lite mix designs for approval. Prior to protection of precast units.

E. Weld Procedure Specifications: Submit Welding Procedure Specifications in accordance with AWS D1.1, D1.3 and D1.4 requirements for all welding which will be performed under this Section.

F. Design Calculations: Submit complete design calculations for governing panel types and connections including loads used in design.

G. Design Modifications:
1. Submit design modifications necessary to meet performance requirements and field conditions.
2. Variations in details or materials shall not adversely affect the appearance, durability or strength of panels.
3. Maintain general design concept without altering size of members, profiles and alignment unless otherwise approved by the Architect/Engineer.

1.6 QUALITY ASSURANCE

A. In-Plant Quality Control:
1. Gate Lite manufacturer (Gate Precast Company) shall have an established PCI quality control program in effect. If requested, a copy of this program shall be submitted to the Architect.
2. Testing of materials and inspection of production techniques shall be the responsibility of the Gate Lite manufacturer's (Gate Precast Company) Quality Control Department.
3. Keep quality control records available for two years after final acceptance.
4. Keep certificates of compliance available for five (5) years after final acceptance.

B. All other testing and inspection to be provided by Owner.

2. PRODUCTS

2.1 PRECAST CONCRETE MATERIALS

A. Portland Cement:
   1. Architectural Mixes: ASTM C150 Type I, II or III cement. For surfaces exposed to view in the finished structure use same brand, type, and source of supply throughout the Gate Lite production.

B. Aggregates:
   1. Architectural Mixes: Fine and coarse aggregate for face mix shall conform to ASTM C33 except for gradation. Aggregates shall be clean, hard, strong, durable, inert, and free of staining and deleterious materials.

C. Water: Free from deleterious matter that may interfere with the color, setting, or strength of the concrete.

D. Admixtures: Conforming to ASTM C260 and/or ASTM C494.

E. Coloring Agent: Conforming to ASTM C979.
   1. Shall not compromise design strength and set time of concrete.
   2. Shall not exceed 10% by weight of cement content.
   3. Shall be stable at high temperature.
   4. Shall be alkali-resistant.

F. Concrete Strength: Concrete strength shall be determined by design and verified by testing, with a minimum 28 day design strength of 5,000 psi.

2.2 STEEL PRODUCTS

A. Structural Shapes.....ASTM A992, ASTM A36, ASTM A572 Grade 50
B. Bars & Plates (3/16" and thicker).....ASTM A36, ASTM A572 Grade 50
C. Pipe.....ASTM A53 Grade B
D. Hollow Structural Sections
   1. HSS - Round.....ASTM A500 Grade B or ASTM 1085
   2. HSS – Rectangular.....ASTM A500 Grade B or ASTM 1085
E. Sheets and Strips (less than 3/16").....ASTM A1011 SS Grade 36 or 50
F. Reinforcing Steel.....ASTM A615 Gr. 60 or ASTM A706 Gr. 60
G. Welded Wire Reinforcing, Plain and Deformed.....ASTM A1064
H. Welded Headed Studs.....ASTM A108/A29 Grades 1010 - 1020, also to conform to AWS D1.1 Chapter 7. Mechanical properties to meet AWS D1.1, Table 7.1 requirements for Type "B" Studs, Fu = 65 ksi, Fy = 51 ksi. Stud dimensions to conform to AWS D1.1 Figure 7.1. Mechanical properties to be verified by Mill Certificates
I. Standard Machine Bolts.....ASTM A108/A29 Grades 1016 - 1026 or A36 material used to manufacture bolts meeting the requirements of ASTM A307 Grade A w/ Supplement 1
J. Threaded Rod (UNC).....ASTM A36, ASTM F1554 Gr. 36, ASTM A572
K. Nuts for Standard Machine Bolts and Threaded Studs.....ASTM A108/A29 Grades 1016 - 1026 or A36 material used to manufacture hex nuts meeting ASTM A563 Grade A requirements
L. High Strength Machine Bolts.....ASTM A325 Type 1, ASTM A449 Type 1, or SAE J429 Grade 5
M. High Strength Threaded Rod (UNC)....ASTM A449 Type 1 or ASTM A193 Gr. B7

N. High Strength Anchor Rods..... ASTM F1554 Grade 55 or 105

O. Nuts for High-Strength Machine Bolts, Threaded Studs, and Anchor Bolts..... ASTM A108/A29 Grades 1016 - 1026 or A36 material used to manufacture heavy hex nuts meeting ASTM A563 Grade A requirements, or ASTM A194

P. Coil Rods and Bolts.....ASTM A108/A29 Grades 1005 - 1026, Fu/Fy = 70/50 ksi minimum with strength verification provided by supplier; high strength coil rods/bolts must not be substituted.

Q. Coil Nuts for Coil Rods and Bolts.....ASTM A108/A29 Grades 1016 - 1026 meeting a minimum proof load stress of 80 ksi, based on the tensile stress area of the matching coil rods and bolts specified above.

R. Gate Lite Anchors..... ASTM A510 Grades 1006 – 1012. Electroplated per ASTM B633 with Fu/Fy = 60/45 ksi minimum.

S. Track and Studs, Cold Formed:

1. Rust Inhibitive Coated.....ASTM A1003 Grade ST33H or ST50H. Coating Designation G60.
2. Galvanized.....ASTM A653 SS Grade 33 or 50 Class 1. Coating Designation G60.

2.3 STEEL PROTECTIVE COATINGS: All thin gauge material (that less than 1/8" thick) shall have either an alkyd rust inhibitive primer or zinc coating (see below). All steel materials in contact with the Gate Lite skin or exposed to weather shall have a zinc coating. Loose attachment hardware equal to or greater than 1/8" thick need not be coated if not exposed to weather. Fasteners can have either an electroplated zinc or cadmium coating.

A. Alkyd Rust Inhibitive Primers (shop primers such as red iron oxide):

1. Tnemec Series FD88 Azeron Primer
2. Ameron 5105
3. Substitutions: Per Division 1

B. Zinc Coatings:

1. Hot-Dip Galvanizing.....ASTM A123 or ASTM A153
2. Hot-Dip Galvanized for Steel Sheet.....ASTM A653
3. Electroplated Zinc for Steel Products and Steel Hardware.....ASTM B633
4. Zinc Rich Paints.....SSPC-Paint 30, DOD-P-21035A & MIL-P-26915

C. Cadmium Coatings:

1. Electrodeposited Coatings of Cadmium.....ASTM B766

2.4 OTHER MATERIALS

A. Carbon Fiber Reinforcement.....(Insert proprietary specification here)

B. FRP Anchors..... (Insert proprietary specification here)

2.5 FABRICATION

A. Gate Lite manufacturer (Gate Precast Company) shall not proceed with fabrication of panels prior to receiving the reviewed set of Shop Drawings and the Architect's acceptance of submitted Samples.

B. Manufacturing procedures shall be in general compliance with PCI MNL-117.

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

D. Forms:

1. Forms for Gate Lite 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. Release agents shall be applied and used according to manufacturer's instructions.

E. 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.

F. Curing: Procedures sufficient to ensure 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.

G. Frame System:
1. Frame shall be a prefabricated welded frame produced in accordance with the reviewed Shop Drawings.
2. All accessible welds shall be touched-up after welding.

H. Manufacturing Tolerances:
1. Overall height and 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 additional 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 additional 10' ..... +/-1/8"
3. Thickness:
   a. Architectural facing ..... +1/8", -0"
   b. Panel depth from face of skin to back of panel frame or integral rib ..... +/-3/8"
4. Variation from square or designed skew (difference in length of two diagonal measurements)..... 1/8" per 6' or 2" total, whichever is greater
5. Local smoothness ..... 1/4" per 10'
6. Bowing: Bowing shall not exceed L/240 unless it can be shown that the member can meet erection tolerances using connection adjustments.
7. Length and width of blockouts and openings within one panel ..... +/-1/4"
8. Location of window opening within panel ..... +/-1/4"
9. Location of blockouts other than window openings ..... +/-3/8"
10. 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.
11. Stud Frame Tolerances:
    a. Vertical and horizontal alignment ..... 1/4" in 10'
    b. Spacing of framing members ..... +/-3/8"
    c. Squareness of frame (difference of diagonals) ..... 3/8"
    d. Overall size of frame ..... +/-3/8"

12. Location of bearing connections.....+/-1/4"
13. Location of embeds and inserts other than bearing connections.....+/-1/2"

I. Panel Identification:
   1. Mark each Gate Lite panel to correspond to identification mark on Shop Drawings for panel location.
   2. Mark each Gate Lite panel with casting date.

J. Panel Finish and Approval: Gate Lite panels and approved Samples shall be viewed side by side from a distance of 20' when comparing texture and color Gate Lite panels which 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.

3. EXECUTION

3.1 PRODUCT TRANSPORTATION AND HANDLING

A. Handle and transport panels in a position consistent with their shape and design in order to avoid excessive stresses or damage.

B. Support panels during shipment on non-staining shock-absorbing material as needed to prevent damage.

3.2 PRE-INSTALLATION RESPONSIBILITY

A. General Contractor's Responsibility:
   1. The General Contractor shall provide the control layout grid lines, including grades, at each building elevation on each floor receiving Gate Lite panels.
   2. The General Contractor shall provide true, level, and clean support and attachment surfaces.
   3. The General Contractor shall provide for the accurate (+/-1/2" in all directions) placement and alignment of connection hardware on the structure.
   4. The General Contractor shall be responsible for patching fireproofing after C-CAPP panel installation.
   5. The General Contractor shall confirm that the dimensions and tolerances of the structure allow for proper installation of the Gate Lite panels.

B. Erector's Responsibility: Prior to installation of the Gate Lite 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.

3.3 ERECTION

A. 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 Gate Lite panels may operate under their own power.

B. Safety Aspects: The General Contractor shall provide all required traffic controls, barricades, warning lights and/or signs to ensure a safe installation.

C. Setting: Gate Lite panels shall be lifted with suitable lifting devices at points provided by the Gate Lite manufacturer (Gate Precast) to prevent excessive stresses or damage to the panels.

D. 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.

E. Tolerances of Erected Panels: Tolerances for location of Gate Lite panels shall be as listed below;

1. Plan location from building grid datum ..... +/-1/2"
2. Top elevation from nominal top elevation:
    a. Exposed individual panel ..... +/-1/4"
    b. Non-exposed individual panel ..... +/-1/2"
    c. Exposed relative to adjacent panel ..... 1/4"
    d. Non-exposed relative to adjacent panel ..... 1/2"
3. Maximum plumb variation over height of structure or 100 ft. whichever is less ..... 1"
4. Plumb in any 10 ft. of element height ..... 1/4"
5. Maximum jog in alignment of matching edges ..... 1/4"
6. Joint width (governs over joint taper):
    a. Panel dimension less than 20' ..... +/-1/4"
    b. Panel dimension over 20' ..... +/-3/8"
7. Joint taper maximum ..... 3/8"
8. Joint taper in 10 ft. ..... 1/4"
9. Maximum jog alignment of matching faces ..... 1/4"
10. Differential bowing as erected between adjacent members of the same design ..... 1/4"

F. Final Connection of Panels to Structure:

1. Gate Lite panels shall be attached to the structure as shown in the reviewed Shop Drawings.
2. All modifications made to details shown on Shop Drawings shall be submitted for review.
3. Welding shall not be performed prior to receipt of the approved submitted Weld Procedure Specifications.

G. Connection Verification: The Erector shall verify that all connections are made per reviewed connection details.

3.4 JOB SITE STORAGE AND HANDLING

A. Erector shall be responsible for the repair of damage to Gate Lite panels that is caused by its own crew.

B. After Gate Lite panels are installed in their final positions, the General Contractor shall be responsible for their protection.

C. The General Contractor shall be responsible for the repair of any damage to the Gate Lite panels caused by someone other than the Gate Lite manufacturer (Gate Precast Company).

3.5 PATCHES AND REPAIRS

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

B. Repairs shall be sound, permanent, and flush with adjacent surface.

C. 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.

3.6 CLEANING

A. Cleaning methods shall be approved by Gate Lite manufacturer (Gate Precast Company).

B. Erector shall clean erection marks from Gate Lite surfaces upon erection.

C. Use care to prevent damage to Gate Lite surfaces and to adjacent materials.

D. Surface must be thoroughly rinsed with clean water immediately after using cleaner.

E. At completion of the project, General Contractor shall be responsible for final cleaning and wash down of building.

3.7 INSPECTION AND ACCEPTANCE: Immediately after the erection is completed, final inspection and acceptance of the erected Gate Lite panels shall be made by the Architect and General Contractor to verify conformance with plans and specifications. In cases where Gate Lite panel installation Gate Lite is phased, panels shall be inspected and approved in phases.

3.8 WARRANTY: All labor and materials under the manufacturer's (Gate Precast Company) contract shall be warranted by the Gate Lite manufacturer (Gate Precast Company) for a period of one (1) year following final approval of the Gate Lite panels by the Architect. Any additional labor or material warrantees, i.e. caulking, shall be passed through to the General Contractor with no responsibility by the Gate Lite manufacturer (Gate Precast Company).

END OF SECTION