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GUIDE SPECIFICATION
FOR
INSULATED SANDWICH WALL PANELS
(Including Corewall Panels)

INDEX

	Page
PART I - GENERAL	1
A. DESCRIPTION.....	1
B. QUALITY ASSURANCE.....	1
C. RELATED SPECIFICATIONS.....	1-2
D. SCOPE OF WORK.....	2
E. SUBMITTALS.....	2
F. SHOP DRAWINGS.....	2
PART II - PRODUCTS.....	2
A. MATERIALS.....	2-3
B. DESIGN.....	3
C. MANUFACTURING.....	3
D. TOLERANCES.....	3-4
PART III - EXECUTION	4
A. JOB SITE CONDITIONS.....	4
B. PRODUCT DELIVERY, HANDLING, STORAGE AND PROTECTION.....	4
C. ERECTION.....	4-5
D. CAULKING.....	5
E. CLEANING	5
F. WARRANTY.....	5

This Guide Specification is intended for the use of professional personnel competent to evaluate the significance and limitations of its contents, and who will accept responsibility for the application of the material it contains.

PART I - GENERAL

A. DESCRIPTION

1. Conform to General Instructions Section _____.
 2. Conform to the latest editions of the following standards:
 - a. American Concrete Institute
 - i. ACI 318 -- Building code requirements for reinforced concrete.
 - ii. ACI 318 R -- Commentary on building code requirements for reinforced concrete.
 - iii. ACI 301 -- Specifications for structural concrete for building.
 - b. American Welding Society
 - i. AWS D1.1 -- Structural welding code - steel.
 - ii. AWS D1.4 -- Structural welding code - reinforcing steel.
 - iii. AWS D12.1 -- Recommended practices for welding reinforcing steel, metal inserts and connections in reinforced concrete construction.
 - c. Prestressed Concrete Institute
 - i. MNL 116 -- Manual for Quality Control for Plants and Production of Precast/Prestressed Concrete Products.
 - ii. MNL 117 -- Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.
 - d. PCI Design Handbook (latest edition)
- And to these specifications

B. QUALITY ASSURANCE

1. Qualifications of Manufacturer
 - a. Manufacturer shall have a minimum of five (5) years of production experience in architectural precast concrete work of the quality and scope required on this project.
 - b. Manufacturer shall be a member of the Precast/Prestressed Concrete Institute and PCI certified.
2. Qualifications of Erector
 - a. Erection of precast concrete panels shall be performed by an established firm regularly engaged for at least two (2) years in the erection of precast concrete panels of sizes similar to those required on this project.
 - b. Perform inspection of panels under the supervision of a foreman employed by the erection firm for this type of work.
3. Qualifications of Welders and Tackers:
 - a. Welder qualifications shall be in accordance with AWS D 1.1

C. RELATED SPECIFICATIONS

1. The following clauses appear under the appropriate sections of these specifications.
 - a. Access for Precast Concrete Erection Equipment.
 - i. The General Contractor shall provide and maintain access and operating space for the equipment of the Precast Concrete Contractor. Such access may consist of, but need not be limited to, roads, ramps and crossing capable of supporting cranes and trucks normal to erection operations of this type maneuvering under their own power. Foundation and utility excavations shall be back-filled where necessary and in accordance with the schedule of erection mutually agreed upon between this Contractor and the Precast Concrete Erection Contractor.

Guide Specification
Insulated Sandwich Wall Panels

- b. Enclosure of Precast Concrete.
 - i. The General Contractor shall not enclose any of the structural precast concrete work until the alignment and connections have been approved by the Architect/Engineer.
- c. Work Supporting Structure Precast Concrete
 - i. Plates, inserts, anchor bolts, etc., shall be supplied and installed by the General Contractor in cast-in-place concrete.
 - ii. Tolerances in placing these items are:
Alignment $\pm 1/8"$ Level $\pm 1/4"$
- d. It shall be the responsibility of other trades to protect the precast panels from damage in the execution of their work.

D. SCOPE OF WORK

- 1. Furnish all materials, labor and equipment for the supply and installation of the precast concrete insulated wall panels as indicated on the drawings and in accordance with these specifications.
- 2. General Contractor shall supply and install the cast-in place concrete, all steel base angles, steel plates, inserts, anchor bolts, etc., required for the installation of the precast panels.
- 3. Supply and install all other non-load bearing connecting angles, inserts, etc., required to fasten the precast panels directly to the structural frame.
- 4. Caulking guideline specifications are included but should be specified under the Caulking Section of the Contract Specifications.

E. SUBMITTALS

- 1. Provide the following finishes: _____
- 2. Interior and exterior finish to match the approved samples available for inspection, at the job site.

F. SHOP DRAWINGS

- 1. Prepare and submit erection drawings to the General Contractor for Architect's approval. Drawings shall indicate panel sizes, sections, assembly methods, reinforcing anchorage, lifting inserts, joining and other necessary data for installation. Drawings shall also indicate and number each facing unit and each unit delivered to the job shall bear the corresponding number clearly marked on the panel.

PART II - PRODUCTS

A. MATERIALS

- 1. Materials shall conform to the provisions of ACI 318, the AISC Manual of Steel Construction and PCI Manuals 116 and 117, with the following additions:
 - a. Minimum concrete released strength for prestressed panels 3,000 psi.

- b. Use Type I or III cement from the same source throughout the entire job.
- c. The maximum size of coarse aggregate shall not exceed those as dictated by approved sample panels.

Page 2

Guide Specification
Insulated Sandwich Wall Panels

- d. Calcium chloride or admixtures containing calcium chloride will not be permitted.
- e. Unless otherwise specified, full width insulation shall be polyisocyanurate foam meeting ASTM C1289.

B. DESIGN

1. Wall panels shall be prestressed to achieve straightness and essentially crack-free surfaces in keeping with PCI tolerances.
2. Design prestressed concrete panels and connections in accordance with the appropriate precast industry standards.
3. Design wall panels to withstand all stresses due to storage, temperature, handling and wind. Both wythes shall be stressed equally to minimize any bowing due to eccentricity to prestress force.
4. Employ a full time Professional Engineer, registered in the State of _____ who shall be responsible for the content of the drawings and calculations to which they shall affix their seal.
5. Provide calculations for the approval of the Architect and/or Consulting Engineer.
6. Wall panel connections shall be designed to permit independent movements of the structural frame in the plane of the wall, due to thermal or other normally encountered loads.
7. Provide in-house Quality Control testing and monitoring to insure product conformity to design.

C. MANUFACTURING

1. Manufacture precast concrete panels as detailed in accordance with approved erection drawings and to meet job requirements and these specifications.
2. Manufacture all units to the tolerance specified.
3. Cast panels in accurate forms. Set reinforcing steel, anchor and auxiliary units to detail.
4. Lifting hooks and inserts shall be recessed and provided in panel sides and ends only, so finished surfaces are not marred.
5. Prestressing shall be provided by high strength strands located longitudinally in both wythes and positioned in such a manner as to achieve straightness, and a balanced stress distribution in both faces.
6. Cure in accordance with the requirements of the plant standards for the manufacture of prestressed concrete given in PCI Manual 117 and so that strength and finish of the unit is not impaired.

D. TOLERANCES

1. Wall Panel Dimensions

Wall panels shall be manufactured and installed so each panel, after erection, complies with the following dimensional requirements:

- a. Tolerance on overall dimensions
Width $\pm 1/4"$
Length $\pm 1/2"$
Thickness $\pm 1/4"$
- b. Location of openings and cast-in items $\pm 1"$.

Page 3

Guide Specification

Insulated Sandwich Wall Panels

- c. Maximum squareness of cut along major axes measured at the end of the minor axes $\pm 1/8"$ per 12".
- d. Maximum bowing or warpage - span (inches)/360.
- e. Maximum warpage of one corner out of the plane of the other three - $1/16"$ per foot as measured to the nearest adjacent corner.
2. Wall Panel Locations
Wall panels shall be manufactured and installed so the joints between the panels are within the limits listed as follows:
 - a. Joint width - as dictated by the job requirements $\pm 1/4"$.
 - b. Joint taper - $1/4"$ per 10' with maximum of $3/8"$.
 - c. Step-in-face - $1/4"$.
 - d. Jog in alignment of edge - $1/4"$.
 - e. Differential bowing or camber as erected between adjacent members of the same design $1/2"$
3. Adherence to above tolerances does not relieve the Precast Subcontractor from the responsibility of providing a neat workmanlike job, with particular attention at corners.

PART III - EXECUTION

A. JOB SITE CONDITIONS

1. The Precast Erector is to check all dimensions at the site concerning precast panel work and report all discrepancies from approved contract and shop drawings to the Contractor for corrective action before proceeding with the erection of this work.
2. The Precast Erector is to report to the Contractor for corrective action, defects or work prepared by other trades which affect work of this section.

B. PRODUCT DELIVERY, HANDLING, STORAGE AND PROTECTION

1. Deliver, handle and store panels so warpage due to bending deflections is minimized.
2. Protect the finished surfaces from damage.
3. Do not store panels on soft ground and do not stack insulated panels more than five (5) high.
4. Protect all lifting devices and hardware from damage.
5. Deliver units to job site and erect in accordance with drawings and specifications.
6. Precast Subcontractor is not responsible for protection of panels from damage by other contractors after installation of the precast

C. ERECTION

1. Set units plumb and true to line (independent of possible deviations in supporting structure) with joints parallel and uniform, and in accordance with approved shop drawings.
2. Connections shall permit adjustment of panels in both horizontal and vertical directions.
3. General Contractor shall provide and maintain suitable access for erection equipment, to all elevations of the building including removal of overhead wiring and other obstructions as necessary.
4. Take all necessary precautions to prevent weld burn or splatter, on exposed surfaces.

Page 4

Guide Specification

Insulated Sandwich Wall Panels

5. General Contractor shall provide and install sufficient temporary bracing to brace the precast units adequately at all stages of construction so units will safely withstand all loads to which they may be subjected (if required). This temporary bracing shall remain in position until all connections have been completed.
6. Replace, patch or refinish damaged, chipped or badly discolored panels to the satisfaction of the Architect.
7. Touch-up all exposed hardware and primer (if required).
8. Protect the work of other trades during erection.

D. CAULKING

1. Caulking of both the interior and exterior panel joints shall be done with the type of caulking and back-up material specified.
2. Exterior caulking shall be two parts polyurethane sealant.
3. Interior caulking except where otherwise specified shall be a latex caulk.
4. Back-up to caulking shall be a non-staining closed cell foam.
5. Caulking work shall be guaranteed against water leakage, lack of adhesion and other defects, for a period of one (1) year.
6. Grouting to be done with expanding or non-shrinking type grout, and formed or troweled, to a neat finish (as required).

E. CLEANING

1. After erection, clean units of dirt and debris.
2. Take precautions not to stain, mark, dirty or damage other work during cleaning operations.
3. Upon completion of the work of this section, remove plant equipment, surplus materials and debris resulting from the work of the trade.

F. WARRANTY

1. This Subcontractor shall warrant that the precast facing units will not spall or show evidence of significant cracking resulting from inferior materials or workmanship of this trade, for a period of one (1) year.
2. Units showing such defects shall be rectified and subsequent materials made good, at no expense to the owner.

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