

Guide Specifications



Structural Precast Concrete (Section 03410)

The Guide Specifications in this catalog may be used as models for either office master specifications or specifications for particular projects. In either case, the Guide Specifications must be edited to fit the conditions of use. Material is included that will not be suitable for every purpose and should be deleted as necessary; other material will have to be added for specific projects. Blanks have been provided where appropriate requirements should be added.

PART 1 – GENERAL

1.01 DESCRIPTION

A. WORK INCLUDED:

Delete if all work to be included is indicated in drawings.

1. _____

B. RELATED WORK SPECIFIED ELSEWHERE:

Edit for project conditions. Revise section numbers if they differ from those used in the project manual.

1. Shop drawings, products data, and samples. Section 01340.
2. Cast-in-place concrete. Section 03300.
3. Cast-in-place, post-tensioned concrete. Section 03365.
4. Precast concrete Hollowcore slabs. Section 03411.
5. Architectural precast concrete. Section 03450.
6. Tilt-up concrete. Section 03470.
7. Fabricated steel not cast into concrete. Section 05500.

8. Waterproofing. Section 071____.
9. Dampproofing. Section 071____.
10. Sheet metal flashing. Section 07620.
11. Sealants and caulking. Section 07920.
12. Painting. Section 09900.

C. WORK INSTALLED BUT FURNISHED BY OTHERS:

1. Reglets to receive sheet metal flashing. Section 07620.
2. Reglets to receive metal windows. Section 08500.
3. Anchoring devices to receive equipment. Division 11.
4. Dumbwaiter and elevator guides. Sections 14100 and 14200, respectively.
5. Anchoring devices to receive mechanical and electrical work. Divisions 15 and 16, respectively.



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1.02 QUALITY ASSURANCE

A. APPROVED MANUFACTURERS:

Include one of the following manufacturer standards:

1. Morse Bros, Incorporated
Prestressed Concrete Group
P.O. Box 181, Harrisburg, OR 97446
(541)995-6327

****or****

1. The manufacturer shall be certified by the Prestressed Concrete Institute.

B. APPROVED ERECTORS:

1. The erector shall have been regularly engaged for at least _____ years in erection of precast structural concrete similar to that required by this project. (Usually 2-5 years)

C. APPROVED WELDERS:

1. The welder shall be certified by the American Welding Society in accordance with AWS D1.1 for welds to be encountered on this project.
2. Maximum age of certificate: 1 year.

D. REFERENCED STANDARDS:

1. Unless otherwise specified herein, comply with requirements specified in MNL-116, Manual for Quality Control for Plants and Production of Prestressed Concrete Products, published by the Prestressed Concrete Institute. Copies may be obtained from the Institute at 209 W. Jackson Blvd. Ste 500, Chicago, IL 60606, (312) 786-0300.

E. REQUIREMENTS OF REGULATORY AGENCIES:

1. Follow local building code requirements if they are more stringent than the requirements in these specifications. Notify the architect / engineer of differences prior to starting work.

F. TESTING:

1. Comply with applicable provisions of the referenced standards (see 1.02.D above).

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1.03 SUBMITTALS

A. SAMPLES:

1. Submit two samples of specified exposed surfaces, no less than 12 x 12 inches in size, showing texture and color, final approval is based on 4' x 4' samples.

B. PRODUCT DESIGN CRITERIA:

1. Submit _____ copies of the following design loadings, in accordance with Section 01340:
 - a. initial handling and erection stresses
 - b. dead and live loads specified on the contract drawings
 - c. other specified loads
2. Design calculations of products not shown on the contract drawings shall be performed by an engineer experienced in precast, prestressed concrete design and registered in the state where the project is located. These calculations shall be submitted for approval upon request.
3. The design shall comply with applicable ACI 318 requirements.
4. Design deviations will be permitted only with the written approval of the architect / engineer, and any such deviations shall provide for an installation equivalent to that originally intended, without additional cost to the owner. Requests for deviations shall be submitted with complete design calculations and drawings.

C. SHOP DRAWINGS:

1. Submit _____ copies of shop drawings including the following information, in accordance with Section 01340:
 - a. plans and / or elevations locating and defining all products to be furnished by the manufacturer.
 - b. sections and details showing connections and cast-in items, and their relation to the structure
 - c. descriptions of all loose, cast-in, and field hardware
 - d. location drawings for field-installed anchors
 - e. erection sequences and handling requirements
 - f. dead, live, and other applicable design loads

Inclusion of the following information may add to the contract summand should be required only if necessary:

- g. an elevation view of each member
- h. sections and details to indicate quantities and position of reinforcing steel, anchors, inserts, etc.
- i. lifting and erection inserts
- j. dimensions and finishes
- k. prestress force and concrete strengths
- l. estimated cambers
- m. transportation methods

D. MANUFACTURER'S INSTRUCTIONS:

1. Prior to product delivery to the jobsite, submit handling and erection instructions to the general contractor, with a copy to the architect / engineer.

E. TEST REPORTS:

1. Submit one copy of each required test report to the general contractor.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. DELIVERY:

1. Comply with contractor's erection sequence schedule.

B. STORAGE AND HANDLING:

1. Protect members against damage, distortion, and discoloration.
2. Store members off the ground.
3. Place stored members so that identification marks are discernible.
4. Do not handle until stresses are released. If stress release is not performed in a continuous operation, do not handle the members until they are sufficiently stressed to sustain handling forces.
5. Store product as required by precast manufacturer.
6. Lift and support near member ends, unless otherwise approved.
7. Storage area shall be stable and provided with foundations that will prevent differential settlement or twisting of members.
8. Separate and support stacked members with battens placed across the full width of the bearing points.



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The contract drawings will normally be prepared using a local precast, prestressed concrete manufacturer's design data and load tables. Dimensional changes which would not materially affect architectural and structural properties or details are usually permissible.

Connection devices on formed surfaces of precast, prestressed concrete must be contained within the member since most members are cast in continuous steel forms that are impractical to penetrate.

Eccentricity of stressing force will generally result in camber in prestressed concrete members. If camber considerations are important, check with your local manufacturer to secure estimates of the amount of camber and of camber movement with time and temperature change.

Camber movement must be taken into account when it affects such features as:

1. Closures to interior non-load bearing partitions.
2. Closures parallel to prestressed concrete members. Whether involving masonry, windows, curtain walls, or others, these must be properly detailed for appearance.
3. Floor slabs receiving cast-in-place topping. The elevations of the top of the floor and the amount of concrete topping must allow for camber of prestressed members.

Cambers less than those obtained under normal design practices are possible but they usually require the addition of tendons or non-prestressed steel reinforcement. Price should be checked with the local manufacturer.

As the exact cross section of precast, prestressed members may vary somewhat from producer to producer, permissible deviations in member shape from that shown on the contract drawings might enable more manufacturers to quote on the project. Manufacturing procedures also vary between plants and permissible modifications to connection details, inserts, etc., will allow the manufacturer to use devices he can best adapt to his manufacturing procedure.

Be sure that the loads shown on the contract drawings are easily interpreted. For instance, on members which are to receive concrete topping, be sure to state whether all superimposed dead and live loads on precast, prestressed members do or do not include the weight of the concrete topping. It is best to list the live load, superimposed dead loads, topping weight, and weight of the member, all as separate loads. Where there are two different live loads (e.g., on the roof level of a parking structure) indicate how they are to be combined.

9. Locate battens no farther from the designated lifting points than a distance equal to the depth of the member.
10. When stacking stemmed members, do not extend battens continuously over more than one stack.
11. Keep lifting devices accessible and undamaged.
12. Do not store shorter members or heavy equipment on upper members of a stacked tier.

1.05 JOB CONDITIONS

A. SEVERE WEATHER PRECAUTIONS:

1. Comply with requirements specified in referenced standards (see 1.02.D above).

B. COORDINATION:

1. Coordinate through the general contractor with other trades affecting or affected by work of this Section.

C. PROTECTION:

1. Protect other work against damage and discoloration caused by work of the Section.

1.06 FIELD MEASUREMENTS

A. PRIOR TO FABRICATION:

1. The general contractor shall verify and submit field measurements to the fabricator prior to fabrication in a timely manner.

B. MEASUREMENT DISCREPANCIES:

1. If field measurements differ slightly from drawing dimensions, modify the work as required for an accurate fit. If measurements differ substantially, notify the architect / engineer in a timely manner prior to the fabrication.

PART 2 – PRODUCTS

2.01 MATERIALS

Delete or add materials to the following list as required for the particular job.

A. PORTLAND CEMENT:

1. ASTM C150 – Type I or III.

B. ADMIXTURES:

1. Air-entraining admixtures: ASTM C260.
2. Water reducing, retarding, accelerating admixtures: ASTM C494.

C. AGGREGATES:

1. ASTM C33 or C330.

D. WATER:

1. Potable and free from amounts of foreign materials harmful to concrete and embedded steel.

E. REINFORCING STEEL:

1. Bars:
 - a. deformed billet steel: ASTM A615
 - b. where bar welding is required, bars shall conform to AWS D1.4
2. Wire:
 - a. cold drawn steel: ASTM A82
3. Wire fabric:
 - a. welded steel: ASTM A185
 - b. welded deformed steel: ASTM A497

F. PRESTRESSING STRAND:

1. Uncoated seven-wire, stress-relieved: ASTM A416, Grade 270K.

G. ANCHORS AND INSERTS:

1. Materials:
 - a. structural steel ASTM A36
 - b. malleable iron (usually specified by type and manufacturer)
 - c. stainless steel: ASTM A666
2. Finish:
 - a. shop primer: manufacturer's standards
 - b. hot dipped galvanized: ASTM A153
 - c. zinc-rich coating: MIL-P-2135, self-curing, one component, sacrificial
 - d. cadmium coating

H. GROUT:

1. Cement grout: Portland cement, sand, and water sufficient for placement and hydration.
2. Non-shrink grout: premixed, packaged, ferrous and non-ferrous aggregate shrink-resistant grout.
3. Epoxy-resin grout: two-component, mineral-filled epoxy-polysulfide, Fed. Spec. MMM-G-560, Type _____, Grade C. (Check with local suppliers to determine availability and types of epoxy-resin grouts)
4. Minimum 28-day compressive strength: _____ psi. (Check with local suppliers to determine compressive strength)

I. BEARING PADS:

1. Elastomeric: conform to Division 2, Section 25 of AASHTO Standard Specifications for Highway Bridges.

The pads specified have a strength of 2500 psi. For many applications, commercial grade pads are adequate and are more economical, but strengths vary and should be determined in advance by the specifier. Bearing strips of hard plastic or pressed, nonstaining hardboard are acceptable for Hollowcore or solid slabs and are more economical than elastomeric bearing pads.

2. Tetrafluoroethylene (TFE) reinforced with glass fibers and applied to stainless or structural steel plates.
3. _____.
(Manufacturer and type to be specified)

J. WELDED STUDS:

1. Comply with AWS D1.1.

2.02 CONCRETE MIXES

A. COMPRESSIVE STRENGTH:

1. Minimum release strength: _____ psi. (Normally 5000 psi. Verify with local manufacturer.)

B. RELEASE STRENGTH:

1. Minimum release strength: _____ psi. (Normally 3500 psi. Verify with local manufacturer.)

C. USE OF SALTS:

1. Use of calcium chloride, chloride ions, or other salts is not permitted.



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2.03 MANUFACTURE

A. STANDARDS:

1. Comply with referenced standards (see 1.02.D above).

B. FORMING AND FINISHING:

1. Concealed surfaces:
 - a. remove fins and large protrusions; fill large holes and rock pockets
 - b. formwork surface texture, air bubble holes, form joint marks, and minor chips, spalls, and color variations are acceptable
2. Surfaces to receive concrete topping:
 - a. roughen for mechanical bond
3. Exposed vertical ends:
 - a. recess strand ends, fill recesses with non-shrink material, and finish to match other adjacent exposed surfaces
4. All other surfaces:
 - a. remove fins and large projections
 - b. fill large holes and rock pockets
 - c. grind smooth form off-sets over 1/8 inch
 - d. remove any ragged edges
5. Exposed sandblasted surfaces:
 - a. blast concrete where indicated with coarse, sharp aggregate to remove matrix approximately 1/16 inch in a depth in accordance with approved sample
 - b. small, unobjectionable imperfections will be accepted
 - c. mix patching, where allowed, as dry as possible; match color of adjacent hardened concrete, as determined by approved trial patch
6. Exposed surfaces to receive plaster:
 - a. leave surfaces straight and clean, to the satisfaction of the plastering contractor
7. Exposed surfaces not cast against formwork:
 - a. match adjacent exposed surfaces
8. All other exposed surfaces:
 - a. fill holes larger than 1/4 inch with sand-cement paste
 - b. coat exposed surfaces with neat cement paste; after the paste has dried, rub surface vigorously with burlap to remove loose particles (finishing costs can be reduced by deleting this process)

C. MANUFACTURING

TOLERANCES:

1. Standard tolerances:
 - a. length $\pm 3/4$ inch, or $\pm 1/8$ inch per 10 feet of length, whichever is greater
 - b. cross sectional dimensions:
 1. less than 24 inches: $\pm 3/8$ inch
 2. 24 to 36 inches: $\pm 1/2$ inch
 3. over 36 inches: $\pm 5/8$ inch
 - c. flange thickness (thin sections): $\pm 1/4$ inch
 - d. position of anchors and inserts: ± 1 inch from center line location shown on drawings
 - e. horizontal alignment (sweep): $1/2$ inch, or $1/8$ inch per 10 feet of length, whichever is greater; maximum of 1 inch gap between two adjacent members due to sweep
 - f. end squareness: $1/2$ inch maximum
 - g. blockouts: ± 1 inch from center line location shown on drawings
 - h. midspan camber deviation from design: $\pm 3/16$ inch per 10 feet of length, $\pm 3/4$ inch maximum
 - i. midspan camber differential between adjacent members after installation: $1/4$ inch per 10 feet of length, $3/4$ inch maximum
 - j. position of reinforcement designed primarily for connections: between $+1/2$ inch and $-1/4$ inch (minus represents a reduction in cover)
2. Special tolerances specified below involve additional expense to the manufacturer and will result in higher costs for the project. If special tolerances are required for some or all of the products, special notes should be made on the drawings or in the specifications noting which pieces or dimensions require special tolerances. Tolerances tighter than the special tolerances indicated can only be obtained through the use of nonstandard special forms and will involve considerable additional cost. Please consult the manufacturer before specifying such tolerances.
 - a. length: $\pm 1/8$ inch per 10 feet, $\pm 1/4$ inch maximum
 - b. cross sectional dimensions:
 1. less than 24 inches: $\pm 1/4$ inch
 2. 24 to 36 inches: $\pm 3/8$ inch
 3. over 36 inches: $\pm 1/2$ inch
 - c. thickness: $+ 1/4$ inch

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- d. position of anchors and inserts:
±1/2 inch from center line location
shown on drawings
- e. horizontal alignment (sweep):
¼ inch, or 1/8 inch per 10 feet of
length, whichever is greater;
maximum of ½ inch gap between
two adjacent members due to sweep
- f. end squareness: 3/8 inch maximum
- g. blockouts: + ½ inch from center line
location shown on drawings
- h. out of square: 1/8 inch per 6 feet
diagonal measurement
- i. warpage, after installation:
1/8 inch per 6 feet of length,
or 3/8 inch, whichever is greater

D. OPENINGS:

- 1. 100 square inch or larger and shown on drawings:
cast in plant following approved shop drawings.
- 2. Smaller than 100 square inches or not shown on
drawings: field cut or core drill neatly, without
chipping, by the trade requiring the opening. (This
requires other trades to field cut or drill holes needed
for their work, and such trades should be alerted to
these requirements through proper notation in their
sections of the specifications. Some manufactures
prefer to install openings smaller than 10 inches
square; this is acceptable if the locations are properly
identified on the drawings.)
- 3. Do not cut reinforcement.

E. INSERTS:

- 1. Cast in structural inserts, bolts, and plates, as shown
on drawings.

F. DETENSIONING:

- 1. Prevent shock, overloading, or unbalanced loading.

PART 3 – EXECUTION

3.01 INSPECTION

A. VERIFICATION OF EXISTING CONDITIONS:

- 1. The erection contractor shall verify that the
structure and surfaces to receive prestressed
concrete members are accurately sized and located,
sound, true, and otherwise properly prepared.
- 2. The general contractor shall be notified prior
to the start of work of any conditions requiring
correction.
- 3. Work shall not be started until conditions are
satisfactory.

3.02 PREPARATION

A. PREPARATORY WORK:

- 1. Place anchor bolt, plates, and dowels accurately to
receive prestressed concrete members.

3.03 INSTALLATION

A. ERECTION:

- 1. Erect members plumb, level, true, in accurate
alignment, and without cumulative dimensional
error. Abut members with uniform joint width.
- 2. Stabilize members securely during erection.
- 3. Anchor members securely and permanently as
indicated on approved shop drawings.
- 4. Remove any temporary bracework upon
completion.
- 5. Fill holes and sinkages with mortar matching the
adjacent surface finish.

B. WELDING:

- 1. Comply with AWS D1.1.
- 2. Exercise care to prevent chipping or cracking of
concrete.
- 3. Clean exposed welds; apply touch-up paint as
required.
- 4. Leave exposed surfaces clean.

C. ATTACHMENTS:

- 1. Members may be drilled or “shot” provided no
contact is made with prestressing steel, subject to
the approval of the precast manufacturer.



3.04 FINISHING

A. PATCHING:

1. Patching will be acceptable providing structural adequacy and appearance are not impaired.
2. Field patching materials shall be furnished by the prestressed concrete manufacturer. Use of patching materials from other sources is not permitted.
3. Match the color and texture of the surrounding concrete.
4. Apply a bonding agent prior to patching.
5. Minimize shrinkage.
6. Replace defective work if patching is ruled unacceptable.

B. PRODUCT CLEANING AND REPAIRING:

1. Clean, repair, and touch up (or replace when directed) any and all products that have been soiled, discolored, or damaged by work of this Section.
2. Remove debris from the project site upon completion of work (or sooner, if directed).