

SPECIFICATIONS

SECTION 01300 - SUBMITTAL PROCEDURES

1.1 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Engineer's and Construction Manager's responsive action.
B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's and Construction Manager's responsive action.

1.2 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

- 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

- 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension to Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

- 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time of coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

- 3. Resubmit Review: Allow 15 days for review of each resubmittal.

C. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities.

D. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approved notation from Engineer's and Construction Manager's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

- D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedures Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

- E. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

- F. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

- G. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

- H. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

- I. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

- J. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

- K. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

- 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.

- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and permit required paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

SECTION 041000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

- A. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1.1 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects, deficiencies and substitute that proposed construction will comply with requirements.

- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer or Construction Manager.

- C. Precast/Installation Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

- D. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

- E. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.2 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Engineer for a decision before proceeding.

- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.3 REPORTS AND DOCUMENTS: Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections.

1.4 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

- D. Installer Qualifications: A firm of individual experience in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in 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 the system, assembly, or product that are similar in material, design, and extent to those indicated for the Project.

- F. Testing Agency Qualifications: An independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329, and with additional qualifications specified in individual Sections, and, where required by authorities having jurisdiction, that is acceptable to authorities.

- G. Manufacturer's Technical Representative Qualifications: A authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- H. Precast/Installation Testing: Where testing agency is indicated to perform precast/Installation testing for compliance with specified requirements for performance and test methods, comply with the following:

- 1. Contractor responsibilities include the following:
a. Provide test specimens representative of proposed products and submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

- b. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.

- c. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.

- d. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.

- 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer, through Construction Manager, with copy to Contractor. Interpret test and inspection results and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.5 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

- 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

- 2. Where services are indicated as Contractor's responsibility, use a qualified testing agency to perform these quality-control services.

- 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

- 4. Retain copies of reports submitted to Engineer and authorities having jurisdiction, when they direct.

- Release inspecting responsibilities to the extent of material tests or inspections where Contractor's responsibility is to provide quality-control services, including testing and inspecting, and where Contractor's responsibility is to construct with the Contract Documents the construction that replaced Work that failed to comply with the Contract Documents.

SECTION 043000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

- 1.1 ACTION SUBMITTALS
A. Product Data: For each type of product.

- B. Design Mixtures: For each concrete mixture.

- C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement.

1.2 INFORMATIONAL SUBMITTALS: Material certificates and test reports.

- 1.3 QUALITY ASSURANCE: Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94C 94M requirements for production facilities and equipment.

- 1.4 PRECONSTRUCTION TESTING: Engage a qualified testing agency (according to ASTM C 1077 and ASTM E 329) to perform preconstruction testing on concrete materials.

- 1.5 FIELD CONDITIONS: Cold-Weather Placement: Comply with ACI 306.1. Hot-Weather Placement: Comply with ACI 301 (ACI 301M).

PART 2 - PRODUCTS

2.1 CONCRETE: GENERAL: Comply with the following unless modified by requirements in the Contract Documents: ACI 301 (ACI 301M) and ACI 117 (ACI 117M).

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
B. Plain Steel Wadied-Wire Reinforcement: ASTM A 1064/A 1064M, fabricated from air-drawn steel wire rod flat sheets.

- C. Bar Supports: Bolsters, chairs, spacers, and other devices for placing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.3 CONCRETE MATERIALS

- A. Cementitious Materials:
1. Portland Cement: ASTM C 150C 150M, Type III.
2. Fly Ash: Not permitted.

- 3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
4. Blended Hydraulic Cement: ASTM C 595/C 595M.

- B. Normal-Weight Aggregates: ASTM C 33/C 33M, graded.
3. Air-Entraining Admixture: ASTM C 260/C 260M.

- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

- E. Water: ASTM C 94C 94M.

- 2.4 FIBER REINFORCEMENT: Synthetic Micro-Fiber: Micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III.

- 2.5 VAPOR RETARDERS: Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4977, not less than 10 mils (0.25 mm) thick.

- 2.6 Expansion- and Isolation-Joint-Filler Systems: ASTM D 1751, asphalt-saturated cellulose fiber or ASTM D 1752, cork, or self-expanding cork.

2.7 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301 (ACI 301M).

- B. Admixtures: Use admixtures according to manufacturer's written instructions.

2.8 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Normal-Weight Concrete:
1. Minimum Compressive Strength, (f'c): See General Notes.

2.9 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

- 2.10 CONCRETE MIXING: Comply with the following unless modified by requirements in the Contract Documents: ACI 301 (ACI 301M) and ACI 117 (ACI 117M).

PART 1 - EXECUTION

- 3.1 FORMWORK INSTALLATION
A. Design, erect, shore, brace, and maintain formwork, according to ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

- B. Construct formwork so concrete members and structures are: size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).

- 3.2 EMBEDDED ITEM INSTALLATION: Place and secure anchorage devices and other embedded items required for fastening work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions. Do not weld with items to be embedded.

- 3.3 VAPOR RETARDER INSTALLATION: Place, protect, and repair sheet vapor retarder according to ASTM E 1745 and manufacturer's written instructions.

- 3.4 STEEL REINFORCEMENT INSTALLATION: Comply with CRSI's "Manual of Standard Practice" for fabricating, bending, and supporting reinforcement.

- 3.5 JOINTS
A. General: Construct joints to be in plain faces perpendicular to surface plane of concrete.

- B. Construction Joints: Install strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

- C. Location Joints in Slabs-on-Grade: Form and place concrete in sections, sectioning concrete into areas no larger than 1000 sq ft. Construct construction joints for a depth equal to at least one-fourth of concrete thickness.

- D. Wall Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

- 3.6 CONCRETE PLACEMENT: Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

- 3.7 FINISHING FLOORS AND SLABS: Comply with ACI 302.1R recommendations for screeding, restriking, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

- 3.8 CONCRETE PROTECTING AND CURING: Cure concrete according to ACI 308. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 308.1 for cold-weather protection and ACI 301 (ACI 301M) for hot-weather protection during curing.

- 3.9 FIELD QUALITY CONTROL: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

- 3.6 CONTROL AND EXPANSION JOINTS: Locate where indicated on plans. If locations are not indicated, limit control joint spacing to the lesser of wall length to height ratio of 1.5 or 25-ft maximum spacing.

- 3.7 LINTELS: Provide lintels where shown and where openings of more than 24 inches are shown without structural steel or other supporting lintels. Provide minimum bearing of 8 inches (200 mm) at each joint unless otherwise indicated.

- 3.8 FLASHING: Install as shown in Architectural Drawings.

- 3.9 REINFORCED UNIT MASONRY INSTALLATION
A. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

- B. Grouting: Do not place grout until entire height of masonry to be grouted has advanced enough to height to resist grout pressure. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

- 3.10 FIELD QUALITY CONTROL: Owner will engage special inspectors to perform tests and inspections and prepare reports. Special inspections according to Level B in TMS 602/ACI 530.1/ASCE 6.

- 3.11 REPAIRING, POINTING, AND CLEANING
A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

- B. Pointing: During the laying of joints, enlarge joints and holes, except weep holes, and completely fill with mortar. Point to joints, including corner openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

- C. In-Progress Clearing: Clean unit masonry as work progresses by dry brushing to remove mortar fins and spacers before laying joints.

- D. Final Clearing: Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 9-4A.

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

- 1.1 ACTION SUBMITTALS: Product Data for each type of product.

1.2 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of the following:
1. Masonry units.
2. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

- 3. Reinforcing bars.
4. Reinforcing mesh.
5. Joint reinforcement.
6. Anchors, ties, and metal accessories.

- B. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting relative compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

- C. FIELD CONDITIONS: Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns. Cold-Weather Requirements and Hot-Weather Requirements or mortar type with construction requirements contained in TMS 602/ACI 530.1/ASCE 6. Protect masonry during construction from staining.

PART 2 - PRODUCTS

- 2.1 PERFORMANCE REQUIREMENTS: Compressive Strength of Masonry (Fm) = 1,500 psi

- 2.2 UNIT MASONRY, GENERAL: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.

- 2.3 CONCRETE MASONRY UNITS: ASTM C 90, Normal Weight.

- 2.4 LINTELS: Concrete Lintels: ASTM C 1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated.

- A. MORTAR AND GROUT MATERIALS: Mortar: Cement: ASTM C 150M 150C, Type II or III; Hydrated Lime: ASTM C 207, Type S; Masonry Cement: ASTM C 910/C 910M; Mortar Cement: ASTM C 1329C 1329M; Aggregate for Mortar: ASTM C 144, Aggregate for Grout: ASTM C 404, Water: Potable.

- 2.5 REINFORCEMENT: Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60; Masonry-Joint Reinforcement: General: Ladder type complying with ASTM A 951/A 951M.

- 2.6 EMBEDDED FLASHING MATERIALS: Coordinate with Architectural Drawings.

- 2.7 MISCELLANEOUS MASONRY ACCESSORIES: Compressible Filler: Promoted filler strips complying with ASTM D 1096, Grade 2A1; compressible up to 25 percent of width and thickness indicated. Sand-Breaker Strips: Asphalt-saturated felt complying with ASTM D 2260 226M, Type I (No. 15 asphalt felt).

- 2.8 MORTAR AND GROUT MIXES: Mortar for Unit Masonry: Comply with ASTM C 270 - Use Type S; Grout for Unit Masonry: Comply with ASTM C 476.

PART 3 - EXECUTION

- 3.1 EXAMINATION: Examine conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work to include: rough-in and built-in construction for piping systems, foundations of the Work to include: rough-in and built-in construction for piping systems, foundations of the Work to include: rough-in and built-in construction for piping systems. Proceed with installation only after unsatisfactory conditions have been corrected.

- A. INSTALLATION, GENERAL: Build chases and recesses to accommodate items specified in this and other Sections. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening. Use full-size units without cutting if possible. If cutting is required to provide a complete pattern or to fill awkward openings, use units cut to match adjacent units. Provide clean, sharp, unchipped edges. Allow units to dry before laying unless writing of units is specified. Install cut units with cut surfaces and, where possible, use exposed ends cut to match adjacent units.

- 3.2 TOLERANCES
A. Dimensions and Locations of Elements:
1. For dimensions in excess of 10 feet, deviation, do not exceed plus or minus 1/2 inch per 12 inches or 1/4 inch maximum.

- 2. For location of elements in plan, do not exceed plus or minus 1/4 inch plus or minus 1/4 inch in elevation, do not exceed plus or minus 1/4 inch in a story height, plus or minus 1/4 inch in a story height, plus or minus 1/4 inch total.

- 3. For location of elements in elevation, do not exceed plus or minus 1/4 inch in a story height, plus or minus 1/4 inch in a story height, plus or minus 1/4 inch total.

- 4. For lines and surfaces, do not vary from straight by more than 1/8 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

- 5. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

- 6. For faces of additional exposed masonry, do not vary from flush alignment by more than 1/8 inch.

- 7. For faces of additional exposed masonry, do not vary from flush alignment by more than 1/8 inch.

- 8. For lines and surfaces, do not vary from straight by more than 1/8 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

- 9. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

- 10. For faces of additional exposed masonry, do not vary from flush alignment by more than 1/8 inch.

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- 27. For faces of additional exposed masonry, do not