SPECIFICATIONS - (CONT)

SECTION 042200 - STRUCTURAL CONCRETE MASONRY

PART 1 - GENERAL
1.01 SECTION INCLUDES
A. Section includes structural concrete masonry shown on the Structural Drawings.
1.02 RELATED SECTIONS
A. Section 013330 - Structural Submittals.
B. Section 014525 - Structural Testing/Inspection Agency Services.
C. Section 032000 - Concrete Reinforcement.
D. Section 033000 - Cast-in-Place Concrete.
1.03 REFERENCES
A. ACI 530.1/ASCE 6/TMS 602 - Specifications for Masonry Structures.
B. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
C. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Harware.
D. ASTM A496 - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
E. ASTM C90 - Standard Specification for Load-Bearing Concrete Units.
F. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens).
G. ASTM C140 - Standard Methods of Sampling and Testing Concrete Masonry Units.
H. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
I. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
J. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.
K. ASTM C476 - Standard Specification for Grout for Masonry.
L. ASTM C1019 - Standard Method of Sampling and Testing Grout.
M. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.
N. ASTM E447 - Standard Test Methods for Compressive Strength of Masonry Prisms.
1.04 SUBMITTALS
A. Submit coarse grout mix design.
B. Upon request, submit material certificates signed by the material supplier that the masonry units, mortar, reinforcement, and joint material complies with specification requirements.
C. Submit shop drawings for masonry reinforcement in accordance with Section 03200.
D. Submit procedures for construction of masonry walls to be filled with coarse grout. Procedures should include high lift or low lift grouting as applicable to project.
1.05 QUALITY ASSURANCE
A. Structural Testing/Inspection Agency shall perform the following quality related items:
1. Verify reinforcing steel for quantity, size, and location.
2. Verify placement of coarse grout as indicated in high or low lift procedure.
3. Verify compressive strength of concrete masonry units, mortar, coarse grout, or masonry prisms for each 5,000 sq. ft. of surface area as follows:
a. Three (3) concrete masonry units shall be tested in accordance with ASTM C140.
b. Six (6) mortar cube specimens shall be tested, three (3) at 7-days and three (3) at 28-days, in accordance with ASTM C109.
c. Four (4) coarse grout specimens shall be tested, two (2) at 7-days and two (2) at 28-days, in accordance with ASTM C1019.
d. In lieu of individual tests of masonry units, mortar, and grout, if directed by the Design Professional, perform one (1) prism test (which consists of three prisms) in accordance with ASTM E447.
B. The Structural Testing / Inspection Agency shall provide special inspections as required by Chapter 17 of the building code as required by Specification 01 4525.
1.06 HANDLING OF MATERIALS
A. Package, handle, and store materials to protect from elements and prevent contamination.

PART 2 - PRODUCTS
2.01 CONCRETE MASONRY
A. Concrete masonry shall have the minimum compressive strength (f'm) specified on the Drawings.
2.02 CONCRETE MASONRY UNITS
A. Concrete masonry units shall conform to ASTM C90, Type II (moisture controlled).
B. Provide light weight concrete masonry units.
C. Concrete masonry units shall have, as a minimum, the net area compressive strength listed in Table 1.6.2.2 of ACI 530.1/ASCE 6/TMS 602 required for the specified f'm.
D. Provide standard units with face dimensions of 16" long x 8" high nominal, unless indicated otherwise.
E. Provide special shapes where indicated on the Drawings.
2.03 MORTAR
A. Mortar shall be Type M or Type S in accordance with ASTM C270. Refer to Drawings for locations.
B. Do not use admixtures that contain chlorides.
2.04 COARSE GROUT
A. Coarse grout shall conform to ASTM C476.
B. Coarse grout shall have the minimum compressive strength specified on the Drawings.
C. Mix grout to a consistency which has a slump between 8 and 10 inches.
D. Do not use admixtures that contain chlorides.
2.05 WATER
A. Provide clean potable water free of deleterious substances.
2.06 REINFORCEMENT
A. Horizontal and vertical reinforcing bars shall comply with Section 03200.
2.07 HORIZONTAL JOINT REINFORCEMENT
A. Horizontal joint reinforcement shall be manufactured with longnitudinal parrallel, deformed side wires in accordance with ASTM A496 and of the size specified on the Drawings. Cross wires shall be No. 9 gage, plain, in accordance with ASTM A82.
B. Provide as a minimum, one side wire for each face shell of hollow masonry units. Provide additional side wires or eye sections for adjustable wall ties as specified for multiwythe wall construction.
C. Provide truss type joint reinforcement, except ladder type reinforcement shall be used for walls with vertical reinforcement.
D. Horizontal joint reinforcement shall be hot-dipped galvanized in accordance with ASTM A153, Class B-2.
E. Provide prefabricated corner and tee shape corner accessories.
2.08 CONTRACTION JOINT MATERIAL
A. Contraction joint material shall comply with ASTM D2000, M2AA-805 with rubber shear keys with a minimum durometer hardness of 80.

PART 3 - EXECUTION
3.01 MIXING
A. Except as otherwise approved for small batches, mix in mechanically operated batch mixers of drum type in which water can be accurately and uniformly controlled. Allow five minutes maximum mixing time, two minutes for dry mixing and three minutes for continued mixing after water has been added. Do not permit volume of batch to exceed manufacturer's rated capacity of mixer drum. Empty drum completely before placing next batch. Keep mixers and wheelbarrows clean. Do not deposit mortar upon or permit contact with ground.
B. Do not use anti-freeze compounds.
3.02 CONSTRUCTION
A. Use dry masonry units. No frozen or wet units shall be used.
B. Discard cracked, chipped, and spalled masonry units.
C. Deliver mortar to mason's board at point of use within 45 minutes after mixing. Do no retempering. Use no admixtures. Use pre-hydrated mortar for tuck points. Prepare pointing mortar with as dry consistency as will produce mortar sufficiently plastic to be worked into joints.
D. During erection cover top of wall with strong waterproof membrane at end of each day when shutdown. Cover partially completed walls when work is not in progress. Extend and secure cover a minimum of 24 in. down both sides. Do not apply uniform floor or roof loading for at least 12 hours after building masonry columns or walls. Do not apply concentrated loads for at least 3 days after building masonry columns or walls.
E. Provide temporary bracing during erection as required to stabilize erected masonry.
F. Except where otherwise indicated, lay block in running bond.
3.03 PLACING AND BONDING
A. Lay masonry in full beds of mortar on mating surfaces, and properly jointed with other work. Buttering corners of joints, deep or excess furrowing of mortar joints is not permitted.
B. Fully bond external corners of concrete block. Where interior block partitions intersect other block walls or partitions, provide control joints with mortar raked back 1/4 inch.
C. Isolate masonry partitions from vertical structural framing members with control joints, with mortar racked back 1/4 inch.
D. Where non-bearing masonry partitions extend to underside of floor, roof deck or structural system, stop masonry short 3/8 to 1/2 inch to allow for live load deflection. Fill gap with soft joint filler.
E. Where masonry chase walls are constructed, one wall can be stopped above ceiling to provide access space.
3.04 CONTRACTION JOINTS
A. Install contraction joints at locations indicated on the Drawings in all masonry walls. Do not run masonry reinforcement through contraction joints.
3.05 TOLERANCES
A. Variation from Unit to Adjacent Unit: 1/32 inch maximum.
B. Variation from Plan of Wall: Maximum 1/4 inch in 10 feet, and 1/2 inch in 20 feet or more.
C. Variation from Plumb: +/- 1/4 inch in 10 feet, +/- 3/8 inch in 20 feet; +/- 1/2 inch maximum.
D. Variation in Level Coursing: +/- 1/4 inch in 10 feet; +/- 1/2 inch maximum.
E. Variation in Joint Thickness: +/- 1/8 inch Maximum.
3.06 CLEANING AND POINTING
A. Clean space as it is completed, but in every case, clean at least once each week. All debris shall be removed to appropriate container and hauled off the site as required to avoid over filling.
B. Dry brush masonry surfaces before mortar has set hard to remove mortar crumbs and accumulation.
C. Clean masonry with commercial brick cleaner approved by brick manufacturer. Protect other work from cleaning materials.
D. Cut out defective mortar and repoint.
3.07 HORIZONTAL JOINT REINFORCEMENT
A. Place horizontal joint reinforcement in the horizontal mortar beds at spacings as noted in the Drawings, except as specified herein.
B. For masonry below grade, space horizontal joint reinforcing at 8 inches vertically.
C. Above lintels and below sills at openings, place a continuous run of horizontal joint reinforcement in the first two bed joints, 8 inches apart. Extend joint reinforcement two feet beyond opening.
D. Joint reinforcement shall be continuous, except it shall not pass through vertical masonry contraction joints. Lap joint reinforcement a minimum of 6 inches.
3.08 ENVIRONMENTAL PROVISIONS
A. Cold weather masonry construction shall comply with the International Masonry All-Weather Council "Recommended Practices and Guide Specifications for Cold Weather Masonry Construction Section 04200."

END OF SECTION 042200

SECTION 051000 - STRUCTURAL STEEL

PART 1 - GENERAL
1.01 SECTION INCLUDES
A. Section includes fabrication and erection of structural steel indicated in the Contract Documents or otherwise required for proper completion of the work.
1.02 RELATED SECTIONS
A. Section 013330 - Structural Submittals.
B. Section 014525 - Structural Testing/Inspection Agency Services.
C. Section 052000 - Steel Joists and Joist Girders.
D. Section 053000 - Metal Decking.
1.03 REFERENCES
A. AISC - Code of Standard Practice for Steel Buildings and Bridges.
B. AISC - Standard Specification for Structural Steel Buildings, 14th Edition.
C. AISC - Specifications of Structural Joints using ASTM A325 or A490 Bolts approved by the Research Council in Structural Connections.
D. AWS D1.1 - Structural Welding Code.
E. AWS A5.1 - Specification for Carbon Steel Electrodes for Shield Metal Arc Welding.
F. AWS A5.5 - Specification for Low-Alloy Steel Covered Arc Welding Electrodes.
G. AWS A5.17 - Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc Welding.
H. AWS A5.20 - Specification for Carbon Steel Electrodes for Flux Cored Arc Welding.
I. SSPC - Steel Structures Painting Manual.
J. ASTM A36 - Standard Specification for Structural Steel.
K. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
L. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
M. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
N. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
O. ASTM A325 - Standard Specification for Structural Bolts, Heat Treated, 120/105 KSI Minimum Tensile Strength.
P. ASTM A490 - Standard Specification for Heat-Treated Steel Structural Bolts, 150 KSI Minimum Tensile Strength.
Q. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Tubing in Rounds and Shapes.
R. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
S. ASTM A992 - Standard Specification for Steel for Structural Shapes For Use in Building Framing
T. ASTM F436 - Standard Specification for Hardened Steel Washers.
U. ASTM F844 - Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.
1.04 SUBMITTALS
A. Contact Design Professional prior to detailing structural steel shop drawings.
B. Reproduction of Structural Drawings for shop drawings is not permitted. Electronic drawing files will not be provided to the Contractor.
C. Submit shop drawings for review.
D. Shop drawings shall clearly indicate the profiles, sizes, ASTM Grade, spacings and locations of all structural steel members, including connections, attachments, anchorages, framed openings, sizes and types of fasteners, method of tightening fasteners, cambers, and the number, type and spacing of the headed shear connectors.
E. For connections and elements designed by the contractor, submit shop drawings and calculations sealed by an engineer licensed in the project state.
F. For record only, submit written welding procedures for each type of welded joint used in accordance with Appendix E of the AWS Structural Welding Code.
G. Maintain at construction office mill certification that the steel supplied meets the specifications.
H. Maintain at construction office certification that high strength bolts supplied meet the specifications.
I. Submit certification that the fabricator meets the required qualifications. If fabricator has to have an independent testing agency to inspect fabrication as required by these specifications, submit the name and qualifications of the independent testing agency.
J. For each approved fabricator that is exempt from Special Inspections of shop fabrications and implementation procedures in accordance with Section 1704.2 of the Building Code, submit "Fabricator's Certificate of Compliance". Provide copies of fabricator's certification or building code evaluation services report and fabricator's quality control manual.
K. Submit certification that the erector meets the required qualifications.
L. Upon request, submit the erection sequence and procedures to be used by the steel erector.
M. Manufacturer's recommendations for expansion anchor installation.
N. Manufacturer's recommendations for adhesive anchor installation.
1.05 QUALITY ASSURANCE
A. Structural Testing/Inspection Agency shall perform the following quality related items:
1. Anchor Bolts
a. Anchor bolt size, configuration, and embedment shall be verified prior to placement of concrete.
2. Welded Connections
a. Inspection shall be in accordance with AWS Structural Welding Code.
b. Visually inspect all field welded connections. Visual inspection of welded joints includes periodic examination of fitup.
c. Ultrasonically inspect 100% of the complete penetration welds.
d. Review approved welding procedures. Verify that welding procedures are being adhered to during field welding.
e. Verify welder qualifications.
3. Bolted Connections
a. Inspection and testing shall be in accordance with AISC Specifications for Structural Joints using ASTM A325 or A490 Bolts.
b. Prior to visual and physical testing, tension testing using a calibration device (Skidmore-Wilhelm) must indicate tensions at least 5% in excess of the AISC minimum. Structural steel erector shall supply the tension calibration device.
c. Test a minimum of 10% of the bolted connections.
1.06 STORAGE
A. Store materials off ground to permit easy access for inspection and identification. Store steel members and packaged items in a manner that provides protection against contact with deleterious materials.

PART 2 - PRODUCTS
2.01 ANCHOR ROD
A. Anchor rods shall conform to ASTM F1554 and shall be a headed rod or threaded rod with a heavy hexagonal nut welded to the bottom of the threaded rod.
B. Provide two hexagonal nuts and two plain steel washers for each anchor rod conforming to ASTM F844.
C. Provide 3/8-inch thick plate washers (4-inch x 4-inch) in lieu of top steel washer on base plates with oversized holes.
2.02 ROLLED STEEL WIDE FLANGE AND WT SHAPES
A. Rolled steel wide flange shapes shall conform to ASTM A992.
2.03 ROLLED STEEL SHAPES, PLATES, AND BARS, EXCEPT WIDE FLANGE AND WT SHAPES
A. Rolled steel shapes, plates, and bars, except wide flange and WT shapes, shall conform to ASTM A36.
2.04 ROUND STRUCTURAL STEEL TUBING
A. Round structural steel tubing shall conform to ASTM 500, Grade C, 42 ksi minimum yield strength.
2.05 SHAPED STRUCTURAL STEEL TUBING
A. Shaped structural steel tubing shall conform to ASTM A500, Grade C, 46 ksi minimum yield strength.
2.06 NON-HIGH-STRENGTH FASTENERS
A. Non-high-strength bolts shall conform to ASTM A307, Grade A, 60 ksi minimum, where noted on the Structural Drawings.
B. Hardened steel washers shall conform to ASTM F436.
2.07 HIGH-STRENGTH FASTENERS
A. High-strength bolts shall conform to ASTM A325 or ASTM A490 as noted on the Structural Drawings.
B. Provide 3/4-inch minimum diameter bolts, unless noted otherwise.
C. Hardened steel washers shall conform to ASTM F436.
D. Spline-type tension control bolts, plain hardened washers and suitable nuts are an acceptable alternate design bolt assembly.
E. Do not use load indicating washers.
2.08 HEADED STUDS
A. Headed steel studs shall conform to the requirements of AWS D1.1.
B. Provide 3/4-inch diameter headed steel studs, unless noted otherwise.
C. Provide heat-resistant ceramic arc shields with studs.
2.09 EXPANSION ANCHORS
A. Expansion anchors shall have been evaluated by the ICC Evaluation Services, Inc. (ICC-ES) with a published evaluation report. Anchors shall be evaluated by ICC-ES Acceptance Criteria 193 and be specifically approved for use in cracked concrete. All anchors shall be approved for [illegible] wind and seismic loads.
2.10 ADHESIVE ANCHORS
A. Adhesive anchors shall consist of:
1. An all-thread steel anchor conforming to ASTM A307, Grade A or ASTM A36, zinc plated in accordance with ASTM B633, unless noted otherwise on the Structural Drawings, and
2. An adhesive conforming to ASTM C881-02, Type IV, Grade 3, CLASS A, B, & C except gel times and epoxy content. Adhesive shall consist of a two component adhesive system contained in side by side packaging connected to a mixing nozzle which thoroughly mixes the components as it is injected into the hole. Adhesive shall have passed ICC Evaluation Services, Inc. Acceptance Criteria 308 for long term creep and be specifically approved for use in cracked concrete.
2.11 WELD ELECTRODES
A. E-70 series low hydrogen electrodes shall conform to AWS A5.1, A5.5, A5.I7, or A5.20.
B. Properly store electrodes to maintain flux quality.
2.12 PAINT
A. Oxide primer shall conform to AISC Specifications, Code of Standard Practice, and SSPC Steel Structure Painting Manual, unless indicated otherwise.
B. Paint primer shall be free of lead and chromate and shall comply with State and Federal volatile organic compound (VOC) requirements.
C. Paint primer shall be compatible with finish coating.
2.13 GALVANIZING
A. Galvanized coating shall conform to ASTM A123.
B. Galvanize bolts, nuts, and washers in accordance with ASTM A153 when used to connect steel members that are specified to be galvanized.
C. Expansion anchors or adhesive anchors specified to be galvanized shall be mechanically galvanized in accordance with ASTM B695, Class 65, Type I.

PART 3 - EXECUTION
3.01 GENERAL
A. Fabricate and erect structural steel in accordance with AISC Specifications and Code of Standard Practice.
B. Notify Design Professional and Structural Testing/Inspection Agency at least 48 hours prior to structural steel fabrication and erection.
3.02 ANCHOR BOLT SETTING
A. Provide templates for setting anchor bolts. Position anchor bolts by using templates with two nuts to secure in place prior to placement of concrete.
B. Do not erect steel where anchor bolt nuts will not have full threads.
3.03 CONNECTIONS
A. Provide a minimum of two fasteners at each bolted connection.
B. Ensure fasteners are lubricated prior to installation.
C. Provide high-strength bolted connections in accordance with AISC Specifications for Structural Joints using ASTM A325 or A490 Bolts.
D. Provide connections for expansion and contraction where steel beams connect to concrete walls or concrete columns and at expansion joints. Secure nuts on bolts against loosening. (Dent threads with a chisel.)
3.04 FASTENER INSTALLATION
A. Bolts shall be installed in holes of the connection and brought to snug tight condition. Tighten connection progressing systematically from the most rigid part to the free edges of the connection to minimize relaxation of the bolts.
B. High-strength bolts installed shall have a hardened washer under the element turned in tightening.
C. Installation and tightening of bolts shall conform to the AISC Specifications for Structural Joints.
3.05 HEADED STUDS
A. Headed studs shall be welded in accordance with AWS D1.1.
B. Locate shear studs directly over the web of beams with flanges less than 0.3 inches thick.
C. The minimum center spacing shall be 6 diameters along the longitudinal axis of the beam and 4 diameters transverse to the longitudinal axis of the beam.
D. Where double rows of shear studs are required, begin double rows at each end of the beam.
E. Remove shields after welding studs.
3.06 EXPANSION ANCHOR INSTALLATION
A. Install in accordance with manufacturer's recommendation.
B. Minimum embedment shall be equal to 4.5 times the anchor diameter unless noted otherwise.
3.07 ADHESIVE ANCHOR INSTALLATION
A. Install in accordance with manufacturer's recommendation.
B. Minimum embedment shall be equal to 4.5 times the anchor diameter unless noted otherwise.
3.08 WELDING
A. Comply with AWS Structural Welding Code. Use prequalified weld procedures.
B. Provide end returns where fillet welds terminate at end or sides. Returns shall be continuous for a distance of not less than two times the nominal size of the weld.
C. Complete penetration joints shall be backgouged to sound metal before the second side is welded or have 1/4-inch root opening with 3/16 x 1 inch backing bar. Access holes are required. Filling access holes is not required.
D. Remove all slag and weld splatter from deposited weld metal.
3.09 SPLICING
A. Splice members only where indicated unless authorized in writing by the Design Professional.
B. Provide shim plates at bottom flange splice at continuous beam splices with different depths.
3.10 CUTTING
A. Do not use flame cutting to correct errors unless authorized in writing.
B. Re-entrant corners shall have a minimum radius of one inch and be free of notches. Notches and gouges resulting from flame cutting shall be finished to a smooth appearance.
3.11 MILL SCALE
A. Remove loose mill scale.
3.12 BOLT HOLES
A. Cut, drill, or punch holes perpendicular to metal surfaces. Do not enlarge holes by burning. Drill or punch holes in bearing plates. Remove burrs.
3.13 PAINTING
A. Paint steel that is not encased in concrete, plaster, or sprayed fireproofing. Do not shop paint in areas to be field welded, contact surfaces of slip critical connections, or areas to receive special finishes.
B. Field paint as required steel that has been welded or that is unpainted after connections have been tightened.
3.14 GALVANIZING
A. Galvanize shelf angles that support the exterior building veneer, for example brick shelf angles.
B. Galvanize environmentally exposed steel, for example mechanical equipment supports.
C. Touch-up welds and abrasions in galvanized members in accordance with ASTM A780.

END OF SECTION 051000

SECTION 052000 - STEEL JOISTS

PART 1 - GENERAL
1.01 SECTION INCLUDES
A. Section includes the manufacture and erection of steel joists and joist girders shown on the Drawings.
1.02 RELATED SECTIONS
A. Section 013330 - Structural Submittals.
B. Section 014525 - Structural Testing/Inspection Agency Services.
C. Section 051000 - Structural Steel.
D. Section 053000 - Metal Decking.
1.03 REFERENCES
A. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
B. AWS D1.1 - Structural Welding Code.
C. SJI - Standard Specifications for Open Web Steel Joists, KCS-Series.
1.04 DESIGN REQUIREMENTS
A. Steel joists, joist girders, and bridging shall be designed by an engineer licensed in the project state.
B. Design joists, joist girders, and bridging in accordance with the Steel Joist Institute (SJI) Standard Specifications.
C. Refer to Drawings for special design requirements, if any.
D. Top chord extensions or extended ends are to be designed for the same tabulated uniform loads used in the design of the associated joists and for a concentrated load of 500 pounds at the end of the of the extension or extended end, unless noted otherwise on the Drawings.
E. Design KCS-Series joists to conform to the load tables published by Vulcraft.
1.05 SUBMITTALS
A. Submit certification letter stating compliance with SJI specifications.
B. Submit detailed shop drawings sealed by the design engineer showing layout of joist units, special connections, and accessories. Include the mark, number, type, location, and spacing of joists and bridging.
C. Upon request, submit mill test certificates.
D. Upon request, submit written welding procedures for each type of welded joint used. Use prequalified joints.
E. Upon request, submit the erection sequence and procedures to be used by the steel erector.
1.06 QUALITY ASSURANCE
A. Structural Testing/Inspection Agency shall perform the following quality related items:
1. Visual inspection of bolted and welded connections.
2. Verify installation of bridging or braces.
3. Verify connections for top and bottom chords.
4. Verify reinforcement of members for concentrated loads.
5. Verify proper bearing.
B. The Structural Testing / Inspection Agency shall provide special inspections as required by Chapter 17 of the building code as required by Specification 01 1425.
1.07 QUALIFICATIONS
A. Manufacturer shall verify that design and manufacture of joists and joist girders conforms with SJI Standard Specifications.
1.08 DELIVERY, STORAGE, AND HANDLING
A. Store and handle joists as recommended in SJI Standard Specifications.

PART 2 - PRODUCTS
2.01 ROLLED STEEL PLATES, SHAPES, AND BARS
A. Steel shall conform to SJI Standard Specifications.
2.02 UNFINISHED BOLTS, WASHERS, AND NUTS
A. Unfinished bolts shall conform to ASTM A307, Grade A, 60 ksi minimum tensile strength. Provide compatible hexagonal nuts and plain washers.
2.03 WELD ELECTRODES
A. E-70 series low hydrogen electrodes conforming to AWS A5.1 or A5.5, A5.17 or A5.20.
B. Provide proper storage for electrodes to maintain flux quality.
2.04 PAINT
A. Primer shall conform to AISC Specifications and Code of Standard Practice and SSPC Steel Structures Painting Manual.

PART 3 - EXECUTION
3.01 MANUFACTURE AND ERECTION
A. Manufacture and erect joists in accordance with SJI Standard Specifications.
B. Members shall have parallel top and bottom chords unless otherwise indicated.
C. Fabricate bearings which rest on sloped surfaces with a slope which conforms to that of the support unless otherwise approved.
D. Provide for connections of kickers and hangers to members.
E. Provide bottom chord extensions at [illegible] and as indicated by the Contract Drawings. Weld bottom chords to members after dead loads have been applied.
F. Provide ceiling extensions in areas having ceilings attached directly to joist bottom chord (not suspended ceilings). Extend ends to within 1/2 inch of the finished wall surface unless otherwise indicated.
G. Camber joists according to SJI Standard Specifications. Negative camber and bent joists are unacceptable.
H. Do not erect joists until supporting work is secured.
I. Provide bridging complying with SJI Standard Specifications. Provide for connections where bridging terminates.
3.02 CONCENTRATED LOADS ON JOISTS
A. Concentrated loads not shown on Drawings must be verified by joist manufacturer for adequacy of joist design. The necessity of any reinforcement required for concentrated loads applied to either the top or bottom chord shall be designed by joist manufacturer.
3.03 HEADER UNITS
A. Provide header units to support openings in floor or roof system not framed with steel shapes.
3.04 SHOP PAINTING
A. Remove loose scale, heavy rust, and other foreign materials from joists and accessories before application of shop paint.
B. Apply one shop coat of steel joist primer paint to joists and accessories, by spray, dipping, or other method to provide a continuous dry paint film thickness of not less than 1.50 mil.
3.05 BEARING
A. Extend ends of steel joists not less than 4 inches over masonry and concrete supports. Extend ends of joists not less than 2-1/2 inches over steel supports. Positive attachment to support shall be made by welding or bolting. In such cases where a shorter end bearing length must be used, such condition must be designed.
B. "U" type anchors are not acceptable unless authorized in writing.
3.06 WELDING
A. Perform welding in accordance with AWS D1.1 "Structural Welding Code". Use AWS Certified Welders.
B. Weld ends of joists resting on steel supports with the minimum weld specified by the SJI standard specifications, unless otherwise indicated on Contract Drawings.
C. Remove all slag and weld splatter from deposited weld material.
3.07 BRIDGING INSTALLATION
A. Permanently fasten bridging before the application of loads.
B. In areas where joists will be exposed to view, align bridging in straight rows to create uniform appearance.
3.08 PROTECTION
A. Provide means for adequate distribution of concentrated loads so that carrying capacity of joists is not exceeded during construction.
B. Provide temporary bridging, bracing, connections, and anchors to ensure lateral stability during construction.
C. Joists damaged during construction shall be replaced or repaired with procedures submitted by the joist manufacturer.
3.09 CUTTING
A. Do not field cut or apply heat to joists or joist girders unless authorized in writing.

END OF SECTION 052000

SECTION 053000 - METAL DECKING

PART 1 - GENERAL
1.01 SECTION INCLUDES
A. Section includes metal decking as indicated on Drawings, specified herein, and needed for a complete and proper installation.
1.02 RELATED SECTIONS
A. Section 013330 - Structural Submittals.
B. Section 014525 - Structural Testing/Inspection Agency Services.
C. Section 051000 - Structural Steel.
D. Section 052000 - Steel Joists and Joist Girders.
1.03 REFERENCES
A. AISI - Specifications for the Design of Cold-Formed Steel Structural Members.
B. AWS D1.1 - Structural Welding Code.
C. AWS A5.5 - Specifications For Low Alloy Steel Covered Arc-Welding.
D. SDI - Basic Design Specifications.
E. SDI - Steel Roof Deck Design Manual.
F. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
1.04 SUBMITTALS
A. Notify the Design Professional prior to detailing shop drawings.
B. Submit detailed shop drawings showing layout and types of deck panels, weld sizes, weld patterns and conditions requiring closure panels, finishes, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories. Include calculations and required information if not completely covered by load tables and products data.
C. Submit mill certification that the steel supplied meets the required specifications.
D. Submit written welding procedures.
E. Submit manufacturer's specifications, section properties, load tables, diaphragm shear tables, noise reduction coefficients (if applicable) and installation instructions for each type of decking and accessories. Include manufacturer's certifications to show compliance with supplementary framing, sump pans, cant strips, curb openings, special jointing and other accessories.
1.05 QUALITY ASSURANCE
A. Structural Testing/Inspection Agency shall perform the following quality related items:
1. Verify placement of deck for alignment and proper lap.
2. Verify welds for size and pattern.
1.06 STORAGE
A. Store materials off ground to permit easy access for inspection and identification. Store steel members and packaged items in a manner that provides protection against contact with deleterious materials.

PART 2 - PRODUCTS
2.01 GENERAL
A. Provide metal deck sheets of three spans minimum wherever possible.
B. Noise reduction coefficients for acoustic deck shall be verified by the result of sound absorption tests conducted in accordance with ASTM C423 and E795.
2.02 DECK ATTACHMENT
A. Use E-60 series electrodes conforming to AWS A5.5.
B. Provide weld washers for material thinner than 22 gage.
2.03 COMPOSITE DECK
A. Composite deck formed from steel sheets having a minimum yield strength of 33,000 pounds per square inch shall conform to ASTM A653 or A1008. Provide roof deck types and gages as indicated on Drawings.
B. Deflection of the composite slab shall not exceed L/360 under the superimposed live load.
C. Where indicated on the Drawings, galvanize finish in accordance with ASTM A525, with a minimum coating of G60, on both sides. The coating shall conform to Federal Specification QQ-S-775-d, Type I, Class E.
D. Provide galvanized closures for columns, girders, where panels change direction, and end closures for panels not closed by bent plates or other means.
2.04 ROOF DECK
A. Metal roof deck formed from steel sheets shall conform to ASTM A653 structural quality (SQ). Provide roof deck types, minimum grades and gages as indicated on Drawings.
B. Before forming, the steel sheets shall receive a hot-dip protective coating of zinc conforming to ASTM A924 with the following minimum coating class, as defined in ASTM A653:
1. All other locations G60
Provide accessories, clips, and other items as required.
C. Roof deck that will be painted in the field (coordinate with Design Professional), shall comply with these additional requirements:
1. Before fabrication of the panel, all surfaces of the galvanized sheet steel shall be processed through a continuous coil coating line, designed to degrease and clean the metal, followed by a chemical conversion coating to etch the surface for proper bond characteristics. The roof deck shall then be coated with a 0.2 mil epoxy primer, oven baked and recoated with a 0.5 mil polyester primer and rebaked. This coil coated prime finish shall be applied to both sides of the material.
2. For decks within aggressive environments after fabrication or assembly of the panel, the exposed surface and the inside periphery of the perforations shall receive the factory applied epoxy primer. The primer shall be oven cured to enhance adhesion and durability characteristics.
Compatibility of all field applied finish paint with the factory applied primer shall be the responsibility of the painting contractor.
D. Provide roof deck units with flush, nested 2-inch end laps and nested side laps, unless otherwise indicated or specified. Provide deck configurations complying with SDI "Basic Design Specifications".

PART 3 - EXECUTION
3.01 GENERAL
A. Load conditions shall be in accordance with Steel Deck Institute sequential loading formulas.
B. Installer must examine the areas and conditions under which metal decking is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
3.02 PLACEMENT
A. Place steel deck units on supporting steel framework and adjust to final position before permanently fastening. Install deck units and accessories in accordance with manufacturer's recommendations and the Drawings, and as specified herein.
3.03 CUTTING
A. Cut holes in deck indicated by the Drawings. Other holes required shall be supplied by those requiring them. Obtain written authorization for additional holes and cutting not indicated on erection drawings.
3.04 WELDING
A. Perform welding in accordance with AWS Structural Welding Code.
B. Provide weld washers for deck thinner than 22 gauge.
3.05 CONCENTRATED LOADS
A. Do not hang concentrated loads exceeding 50 pounds from the deck.
3.06 DECK SUPPORTS
A. Fasten deck to steel framework at ends and at each intermediate support by welding according to manufacturer's specifications unless indicated otherwise on structural drawings or otherwise specified herein. Do not weld deck in place until all bolted and welded connections for the structural frame are complete. A minimum of one floor over the area to be decked is to be bolted and welded prior to welding deck in place.
3.07 COMPOSITE DECK
A. Place steel floor units in straight alignment. Maintain a maximum space of 1/4 inch between ends of abutting units. In no case shall the ridges of the composite deck be located over beams or girders running parallel to the span of the deck.
B. Unless shown otherwise on the Drawings, weld panels in place with 3/4- inch puddle welds or shear connectors spaced at not more than twelve inches on center at each support. Fasten side laps with stitch welds 1-1/2 inches long not exceeding a spacing of two feet on center. Where two panels butt, fasten each unit with separate welds. Lapping ends of panels is not acceptable. Side laps may be fastened by screws or button punching if approved by the Design Professional.
C. Fasten closures securely in place with welds or screws at two feet on center to supports and adjacent panels.
D. Contractor may elect to shore deck to reduce deflection and overrun of concrete. Do not shore structural beams or girders unless indicated on Drawings or authorized in writing by Design Professional.
E. Cut holes in deck after concrete is in place.
3.08 ROOF DECK
A. Place roof deck in straight alignment. Lap ends of sheets two inches.
B. Attach side laps of roof deck with as shown on the Drawings. Fasteners for side laps and overlying roofing material in dovetail deck shall be concealed within the depth of the dovetail shaped ribs. Within aggressive environments, fasteners shall be stainless steel.
C. Fasten roof deck in place as shown on the Drawings.

END OF SECTION 053000

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