

SECTION 05100
STRUCTURAL STEEL



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PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish all necessary anchor bolts, bearing plates, inserts, connection - material, and/or other accessories, necessary and incidental to completely erect all structural steel.
- B. Items which require setting in concrete, or attachment to materials of other trades shall be furnished to the General Contractor for his placing or proper handling. The fabricator's shop drawings shall include accurate dimensioned plans for placement of these items to properly receive the steel.
- C. Related work specified elsewhere:
 - 1. Cast-In-Place Concrete: Section 03300
 - 2. Grout: Section 03600
 - 3. Unit Masonry: Section 04200
 - 4. Metal Joists: 05200

1.02 QUALITY ASSURANCE

- A. All structural steel framing shall conform to the American Institute of Steel Construction Specifications for the "Design Fabrication and Erection of Structural Steel for Buildings", latest edition.
- B. Where high strength steel is specified submit certified mill test reports and an affidavit stating conformance with the specified grade of steel.
- C. Welding:
 - 1. Both shop and field welds shall be made only by welders and welding operators who have been previously qualified by test as prescribed in the "Code for Welding in Building Construction" of the American Welding Society, to perform the type of work required by these specifications and the structural drawings.
 - 2. Current and valid certificates of qualifications for both welders and welding operators shall be carried on their persons at all times. Originals of exact reproductions of the certificates shall be delivered to the Architect upon demand.

1.03 SUBMITTALS

- A. Complete fabrication shop drawings and erection plans shall be submitted to the Architect for review prior to fabrication. Shop drawings must carry the stamp of the contractor showing they have been checked by him. Shop drawings shall include layouts for all structural steel work and all details of construction for fabrication and erection, including anchor bolt setting plan where required. Special erection devices, if required, shall be clearly shown and provided for. Details for bevel and grooved, full penetration type butt weld splices, shall be detailed on the shop drawings. Submit drawings in accordance with requirements described in Section 01340.
- B. The review of shop drawings shall not relieve the Contractor of his responsibility for constructional accuracy and fit and for agreement of all information shown on the plans with Architect's and Engineer's drawings, specifications and written instructions.
- C. The omission from the Contractor's shop drawings of any material shown on contract drawings or called for in the specifications shall not relieve the Contractor from furnishing same or money equivalent even though the Architect has returned such drawings without comment. Inadequate connection details which become apparent after erection shall be corrected by the Contractor at no cost to the Owner even though the shop drawings have been previously reviewed by the Engineer and/or Architect unless the specific detail is called to the attention of the Engineer on the shop drawing.

1.04 FIELD MEASUREMENTS

- A. Take all measurements in field as required to verify or supplement dimensions shown on drawings and assume responsibility for fit of all work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Structural steel: ASTM A-36 (unless otherwise noted).
- B. Anchor bolts: ASTM A307
- C. High strength bolts: ASTM A325
- D. Common bolts: ASTM A307
- E. Welding electrodes for manual-shielded metal arc welding shall

conform to E-60 or E-70 series (ASTM A233) as required for strength.

F. Paint: Fed Spec. TT-P-86, Type I.

2.02 FABRICATION

- A. Unless otherwise specified, fabrication of structural steel framing shall conform to applicable requirements of the AISC specification.
- B. All materials used shall be of domestic manufacture and source of supply.
- C. Bolt holes are to be accurately drilled or punched. The several pieces forming one built-up member shall be straight and true and fit closely together, especially where exposed to view.

2.03 SHOP PAINTING

- A. Apply one coat of approved shop paint to all steel work, except where to be encased in concrete or sprayed fireproofing materials.
- B. Clean all steel work by hand-wire brushing or by other methods elected by the fabricator, all loose mill scale, loose rust, weld slag or flux deposit, dirt or other foreign matter, whether to be shop painted or not. Remove by solvent all oil and grease deposits.
- C. Clean all contact surfaces as above before assembly. Do not paint contact surfaces.
- D. Surfaces within two inches of any field weld locations to be free of materials that would prevent proper welding or produce objectionable fumes while welding is being done.
- E. Exposed steel shall receive field coats. Steel exposed in exterior wall cavities, embedded in outside walls or in contact with earth, shall be field coated on the exposed surface with an approved mastic unless protected by flashing. All steel required to be shop coated shall be spot painted with material used for shop coat at field bolts, field welds and serious abrasions.

PART 3 - EXECUTION

3.01 PREPARATION

- A. The workmanship and finish shall be equal to best practices in modern structural fabricating work. Materials arriving from

the mills should be protected from weather and have clean surfaces before being worked in the shops.

- B. Materials shall be thoroughly straightened in the shop by accepted methods before laid out or worked in any way.
- C. Welding where required shall be in accordance with the "Code for Welding in Building Construction" of American Welding Society.
- D. Shearing and clipping shall be neatly and accurately done.
- E. All bolt holes shall be accurately spaced and punched.

3.02 CONNECTIONS

- A. Shop connections shall be welded or bolted with ASTM A325-SC (Slip critical) high strength bolts. Field connections shall be bolted with ASTM A325-N high strength bolts except as otherwise noted on drawings.
- B. Seated connections on column webs shall be designed as required to prevent bending of column webs. Where feasible, use double angle connections in lieu of seated connections.
- C. Complete penetration welds, where designated on drawings, to be certified by x-ray examination or by equivalent appropriate test as directed by Engineer or testing laboratory.
- D. Where shop detail causes excessive eccentric load on a member, Contractor shall, at no additional cost to Owner, modify the detail as required to produce minimum eccentricity.
- E. If reactions of beams are not shown on drawings, connections shall be selected to support half the total uniform load capacity for the given shape, span and steel specification of the beam in question. The effect of concentrated loads near an end connection shall also be considered.

3.03 ERECTION

- A. Erect structural steel in accordance with current requirements of the American Institute of Steel Construction and reviewed shop drawings. Erect all steel plumb and level within the limits defined by AISC Code of Standard Practice. Provide all temporary bracing required for proper alignment and stability during erection. Temporary bracing and or shoring shall remain during erection and as long thereafter as required by safety.
- B. All column cases and leveling plates shall be set by this Contractor, but will be grouted in by others. Beam

bearing plates and loose lintels will be set by the concrete contractor and masonry contractor respectively.

- C. Steel contractor shall set column bases on steel wedges or angle screeds to accurate elevations approximately 1-1/2" clear of concrete unless otherwise shown on drawings. Wooden wedges will not be permitted.
- D. Field connection by burning is prohibited unless approved by the Architect. Bring assembled parts into close contact using drift pins only for positioning, not to enlarge hole.

END OF SECTION



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SECTION 05101
STRUCTURAL STEEL WELDING

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PART 1 - GENERAL

1.01 CONTRACT PROVISIONS: Conform to Division 1.

- A. Welder, Tacker and Welding Operator Qualifications: Make welds only by operators previously qualified by test prescribed in code for Welding in Building Construction, WS D1.0-69, of the American Welding Society, to perform type of work required. Show qualifications card to Architect, field inspector, upon request.
- B. Reference Specifications: Comply with AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", 7th edition, section 1.17 Welds.
- C. Minimum Size of Fillet Welds: Conform to following table.

Material Thickness of Thicker Part Joined (inches)	Minimum Size of Fillet Weld (inches)
To 1/4 inclusive	1/8
Over 1/4 to 1/2	3/16
Over 1/2 to 3/4	1/4
Over 3/4 to 1-1/2	5/16
Over 1-1/2 to 2-1/4	3/8
Over 2-1/4 to 6	1/2
Over 6	5/8

- D. Minimum weld length to be four (4) times nominal weld size. See Architect's structural details and steel fabricators approved shop drawings for specific weld locations and details.
- E. Base Metal and Applicable Welding Processes and Materials: See table 1.17.2 or referenced specification.
- F. Welding Gauge Sheet Metal to Structural Sections: Metal deck less than 22 gauge shall be fastened by means of welding washers. Do not burn holes in sheet metal. All sheet metal melted by welding operations will be removed, replaced, and correctly welded at Contractor's expense.

PART 2 - PRODUCTS

- A. As referenced specification and other sections of this division.

PART 3 EXECUTION

3.01 GENERAL:

- A. As referenced specification and other sections of this division.
- B. Identification: Each Welder to mark his identification symbol on his work.
- C. Repair of Welds: Correct defective or unsound welds or base metal. Contractor to pay for costs of repairs.

END OF SECTION

SECTION 05320
METAL FLOOR DECK (grating)



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PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish and install all metal floor grating, complete, as called for under Alternate No. Two:
 - 1. Metal floor grates, fillers and plate closures.
 - 2. Cutting of openings for work of other trades approved by the Architect/Engineer
- B. Related Work Specified Elsewhere:
 - 1. Structural Steel: Section 05100

1.02 QUALITY ASSURANCE

- A. Acceptable Manufacturers: Indiana Gratings Co.
- B. Erector Qualifications: Minimum of 5 years experience on comparable floor deck projects.
- C. Design Criteria
 - 1. Grating type= JS-36
 - 2. Span between joist support = 4'-0" max
 - 3. sheet size = 24" x 24'-0"
 - 4. Maximum deflection under total uniform superimposed load: 1/360 span length, center to center of supports.

1.03 SUBMITTALS

- A. Shop Drawings
 - 1. Deck layout, framing, and supports, with unit dimensions and sections, which shows the type, gauge, method of anchoring.
 - 2. Type and location of welds.
 - 3. Details of fasteners and accessories.
- B. Manufacturer's Literature: Recommended installation instructions.
- C. Coordinate the shop drawings with the structural steel or other trades and the other trades and the applicable drawings and sections of this specification relating to same.
- D. Do not commence with the fabrication of the floor units until receipt of shop drawings reviewed by Architect/Engineer submitted by deck manufacturer.
- E. The omission of any materials from this Contractor's plan

that are shown on the contract drawings or called for in the specifications, shall not relieve the Contractor from Furnishing such materials, even though the Architect or Engineer has returned shop drawings without comment.

- F. The review of shop drawings shall not relieve the Sub-Contractor of his responsibility for constructional accuracy and fit, and for agreement of all information shown on the plans with contract drawings, specifications and written instructions.

END OF SECTION

SECTION 05500
METAL FABRICATIONS



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PART 1 - GENERAL

1.01 DESCRIPTION

- A. All miscellaneous steel shapes and sheet metals.
- B. Railings (internal non-ornamental)
- C. Sleeves through masonry or concrete for all miscellaneous and ornamental work.
- D. Metal stairs, ladders, and cat walks.
- E. Related Work Specified Elsewhere:
 - 1. Cast-In-Place Concrete: Section 03300
 - 2. Grout: Section 03600
 - 3. Unit Masonry: Section 04200
 - 4. Rough Carpentry: Section 06100
 - 5. Metal Doors and Frames: Section 08100

1.02 SUBMITTALS

- A. Furnish shop drawings indicating details, methods of assembly and hardware locations of all items to be manufactured for the project to the Architect for approval.
- B. Furnish cuts or drawings indicating details and method of assembly of all stock items not manufactured specifically for the project to the Architect for approval.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Stock commercial products suitable for intended use and conforming substantially to details indicated on drawings and these specifications will be acceptable.
- B. Materials shall be type, class, temper, etc., which best suit the intended use and shall conform with following Federal Specifications and other listed standards.
 - 1. Bronze for castings, casting alloy, 85% copper, 5% zinc, 5% tin, and 5% lead.
 - 2. Iron castings, gray ASTM A48-74.
 - 3. Priming paint, iron oxide TT-P-31 or synthetic TT-P-636.
 - 4. Screws for use in aluminum or stainless steel

work, commercial stainless steel.

5. Steel, structural ASTM A36-75.
6. Pipe Fittings, ASTM A420-75A.
7. Pipe, steel, ASTM A120-73, standard weight.
8. Miscellaneous Sheetmetal ASTM A506-73, galvanized 26 gauge.
9. Aluminum, 6063-T5 alloy, shapes and sizes as shown.
10. Sleeves: Schedule 40 PVC
11. Grout: Porok or equal.

2.02 FABRICATION

- A. Miscellaneous steel shall be structural steel of suitable shape for the design. The length of bearings at each end of lintels shall not be less than one (1") inch per foot of span and no case less than six (6") inches.
- B. Sleeves shall be Schedule 40 PVC of size to provide not less than 1/4" tolerances all around between inside of sleeve and pipe or other part for which sleeve is required.
- C. Miscellaneous sheetmetal that may be required as shown on the drawings or specified. This does not apply to sheetmetal for roofing and flashing or mechanical equipment which is specified under other sections.
- D. Steel railings shall be of the size and shape shown on the drawing.
- E. Metal stairs and ladders shall be steel of the size and shape detailed on the drawing.
- F. Factory made items and sub-assemblies shall conform with the following unless specifically indicated otherwise on the drawings:
 1. Fabricate work to shape and size with sharp lines and angles and smooth surfaces. Connections shall be welded, bolted, or riveted. Rabbets, lugs, and brackets shall be provided so work can be assembled in a neat substantial manner. No sharp corner or edges shall be exposed. Joints exposed to weather shall exclude water or be built to drain to exterior.
 2. One coat of priming paint shall be applied to all miscellaneous and ornamental iron and steel work, except galvanized materials. Exposed areas shall be evenly coated and free from runs, sags and filled corners.
 3. Rail posts shall be set in plastic sleeves as shown on drawings.

END OF SECTION