

SECTION 05125**NEW STRUCTURAL STEEL/METALS****PART I GENERAL****1.1 SCOPE**

Design, fabrication, and installation of miscellaneous metal items for protective barriers, lifting assemblies, rigging, and temporary bracing and supports.

1.2 RELATED SECTIONS

- A. Section 01120 - Debris/Waste Handling Criteria.
- B. Section 05126 - Structural Steel Dismantlement.

1.3 REFERENCE MATERIALS

See the Invitation for Bid/Request for Proposal (IFB/RFP) for the following:

- A. Index of Drawings.
- B. Photographs.
- C. Drawings.

1.4 REFERENCES, CODES, AND STANDARDS

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM A36-94 Standard Specification for Carbon Structural Steel.
 - 2. ASTM A307-94 Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - 3. ASTM A325-94 Standard Specification for Bolts, Structural Steel, Heat Treated, 120/105 KSL Minimum Tensile Strength.
- B. American Welding Society (AWS):
 - 1. ANSI/AWS A2.4-93 Standard Symbols for Welding, Brazing, and Nondestructive Examination.
 - 2. ANSI/AWS D1.1-96 Structural Welding Code, Steel.
 - 3. ANSI/AWS D1.2-90 Structural Welding Code, Aluminum.
 - 4. ANSI/AWS D1.3-89 Structural Welding Code, Sheet Steel.
- C. American Institute of Steel Construction (AISC):
 - 1. AISC Manual of Steel Construction - Allowable Stress Design (ASD), 9th Edition.

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2. AISC Manual of Steel Construction - Load and Resistance Factor Design (LRFD), 2nd Edition.
- D. American National Standards Institute (ANSI):
- ANSI A10.13-89 Construction and Demolition Operations - Steel Erection - Safety Requirements.

1.5 SUBMITTALS

- A. The Contractor shall submit the following for conformance review by FDF:
1. Calculations: Indicate design method, assumptions, loads, member forces, allowable stresses, and connection designs.
 2. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 3. Indicate welded connections using standard ANSI/AWS A2.4 welding symbols. Indicate net weld lengths. Submit copies of welder's certifications with shop drawings.
 4. A plan for conducting and documenting field quality testing and inspection including test methods and reports required under Field Quality Assurance.
 5. Provide Material Safety Data Sheets for primer and finish coatings to be applied to new structural steel, and for welding materials.
 6. Contractor's AWS Welding Program for approval.
 7. Mill Test Reports for structural steel
- B. For additional submittal requirements see Part 6 of the Invitation for Bid/Request for Proposal (IFB/RFP).

1.6 DELIVERY, STORAGE, AND HANDLING.

ASTM A325 high strength bolts shall be delivered to the site in the original labeled containers and once onsite shall not be transferred into unlabeled containers. The label information shall include the type of bolt, purchase order number, and the name of the supplier.

PART II PRODUCTS**2.1 MATERIALS**

- A. Steel sections and plates: ASTM A36

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- B. Structural Fasteners: Bolts shall be hardened and meet ASTM A325; nuts shall be heavy hex type meeting ASTM A563, Grade C; and washers shall be hardened and meet ASTM F436, Grade 1.
- C. Miscellaneous Fasteners: shall meet ASTM A307
- D. Expansion Anchors: Expansion bolts used for securing steel to concrete shall be one of the following:
 1. "Parabolt" as manufactured by Molly Fastener Group of Emhard, Temple, PA 19560.
 2. "Wedge Anchors" as manufactured by ITT Phillips Drill Division, Michigan City, IN 46360.
 3. "Kwik Bolt" as manufactured by Hilti, Inc., Stamford, CT 06405,
 4. FDF-approved equal.
- E. Welding Materials: ANSI/AWS D1.1 - Structural Welding Code. Use E70XX electrodes.
- F. Abide by requirements of Federal Fastener Act.
- G. Shop Primer: Short-oil alkyd that is VOC compliant.

2.2 FABRICATION

- A. For delivery to site, fit and ship assembled in largest practical sections.
- B. Supply components required for connecting and anchorage of fabricated structural assemblies.
- C. All welding procedures, welder's certification, and visual acceptance criteria must be in accordance with ANSI/AWS D1.1, Chapter 5.
- D. Clean surfaces of rust, scale, grease, and foreign matter prior to applying shop primer. Prepare surface in accordance with paint manufacturer=s instructions.
- E. Shop prime with one coat of short-oil alkyd primer per manufacturer=s instruction for primer (dry film) coat thickness.
- F. Do not prime surfaces in direct contact with concrete or within three inches of where field welding is be required.
- G. All coatings shall be free of lead and chromium.

PART III EXECUTION**3.1 PREPARATION**

Prior to fabrication, the Contractor shall verify field dimensions.

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- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Allow for installation loads and provide temporary bracing to maintain true alignment until completion of installation.
- C. Field weld components as indicated on the approved drawings. Field welding shall be in accordance with ANSI/AWS D1.1, Chapter 3.
- D. Fasteners shall be tightened to manufacturer's specifications or applicable design requirements.
- E. Field modifications to load bearing structures shall require prior approval from FDF.
- F. After installation, prime field welds and abrasions. Any steel embedded in concrete is an exception.
- G. All steel shall be fabricated and installed in accordance with the AISC Manual of Steel Construction.
- H. After use, all steel shall be dismantled and cut for containerization in accordance with Section 01120 and Section 05126.

3.3 QUALITY ASSURANCE

- A. Calculations and shop drawings must bear the stamp of a Professional Engineer registered in the State of Ohio.
- B. The Contractor shall inspect high-strength bolted connections for all shop-fabricated steel, and perform tests and prepare test reports in accordance with the AISC specifications. All test results shall be submitted to FDF.
- C. The Contractor shall conduct tests and shall state in each test report whether test specimens comply with requirements, and shall specifically state any deviations. Deviations must be approved in writing by FDF.
- D. Shop and Field Welding
 - 1. The Contractor shall: inspect and test, during fabrication and installation of structural steel assemblies in accordance with ANSI/AWS Structural Welding Code and as follows:
 - a. Conduct inspections and tests as required. Record types and locations of all defects found in the work. Record work required and performed to correct deficiencies. All test results to be submitted to FDF.
 - b. Perform visual inspection of all welds per AWS D.1.1.
 - c. All welds that fail shall be repaired per approved Contractor AWS Welding Program.

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- d. Reworked areas shall be re-tested using the same method as used to find original indications.
- 2. Perform nondestructive tests of welds per AWS D.1.1. Full penetration welded connections on structural steel rigging frame utilized for critical lifts, as defined in the FEMP Hoisting and Rigging Manual, shall be 100 percent radiograph tested by an independent certified testing lab. Results shall be submitted to FDF for approval.
 - a. All welds that fail testing shall be repaired per approved Contractor AWS Welding Program.
 - b. Reworked areas shall be re-tested using the same method as used to find original indications.

E. Correction of Substandard Work:

The Contractor shall correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements.

END OF SECTION