
SECTION 32 31 13
CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 GENERAL

- A. Section Includes: Security Fence Type 4C and Gate Type 5D indicated on Landscape Drawings.
1. This work consists of all labor, materials, and equipment necessary for furnishing and installing chain link fence, gates and accessories in conformance with the lines, elevations, and details as shown and state and local codes and requirements.
 2. Vertical chain link fencing and gates with locks.
 3. Primary structural framing system, secondary supports, brackets, hardware, and anchors for supporting and mounting chain link fencing.
 4. Delegated Design; See DESIGN REQUIREMENTS below.

1.2 RELATED WORK

- A. Temporary Construction Fence: Section 01 52 00, Construction Facilities and Temporary Controls.
- B. Temporary Construction Fence: Section 01 56 26, TEMPORARY FENCING MAINTENANCE
- C. Grounding of fencing for enclosures of electrical equipment and for lightning protection as shown: Section 26 05 26, Grounding and Bonding for Electrical Systems. Finish Grading: Section 31 20 00, EARTH MOVING, and Section 32 91 19, LANDSCAPE GRADING.
- E. Card Reader and connection to lock: Section 28 13 11, PHYSICAL ACCESS CONTROL SYSTEMS.
- F. Ornamental Security Fences: Section 32 31 54, ORNAMENTAL SECURITY FENCING.

1.3 MANUFACTURER'S QUALIFICATIONS

- A. Fence, gates, and accessories shall be products by a manufacturer regularly engaged in manufacturing items of type specified.

1.4 SUBMITTALS

- A. In accordance with Section 01 33 23, Shop Drawings, Product Data and Samples, or as directed by Resident Engineer; furnish the following:
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.
1. Fence and gate posts, rails, and fittings.
 2. Chain-link fabric, reinforcements, and attachments.
 3. Accessories.

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4. Gates, hardware, and locks.
 - C. Shop Drawings: Include system structural engineering design, design calculations upon request, plans, elevations, sections, details, and attachments to other work. Show accessories, hardware, gate operation, and operational clearances. Show reinforcing.
 1. Foundations: Show foundations for all posts.
 2. Corner Post: Detail with bracing to adjacent line post and method of adjustment.
 3. Sealed Drawings: See QULAITI ASSURANCE below.
 - D. Certification that fence alignment meets requirements of contract documents.

1.5 APPLICABLE PUBLICATIONS (Latest editions unless otherwise noted)

- A. American Society for Testing and Materials (ASTM):
 - A392 Zinc-Coated Steel Chain-Link Fence Fabric.
 - C94 Ready-Mixed Concrete.
 - F567 Installation of Chain-Link Fence.
 - F626 Fence Fittings.
 - F900 Industrial and Commercial Swing Gates.
 - F1043 Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
 - F1083 Pipe, Steel, Hot-dipped Zinc-coated (Galvanized) Welded for Fence Structures.
 - F1184 Industrial and Commercial Horizontal Slide Gates.
- B. Chain Link Fence Manufacturers Institute (CLFMI):
 - CLF 2445 Product Manual

1.6 DESIGN REQUIREMENTS

- A. Delegated Design: Provide structural engineering of the entire chain link fencing enclosure system, including primary structural framing system and secondary supports, by a registered professional engineer licensed in the State in which the project is located.

1.7 QUALITY ASSURANCE

- A. Engineer: Drawings and associated calculations required for structural design shall bear seal and signature of professional engineer registered in state in which Project is located and be prepared under the engineer's direct supervision. Maintain calculations on file and submit to Resident Engineer upon requested.
- B. Manufacturer: Fence, gates, and accessories shall be products of manufacturer regularly engaged in manufacturing items of type specified.

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. General: Materials shall conform to ASTM F1083 and ASTM A392 ferrous metals, zinc-coated; and detailed specifications forming the various parts thereto; and other requirements specified herein. Zinc-coat metal members (including fabric, gates, posts, rails, hardware and other ferrous metal items) after fabrication shall be reasonably free of excessive roughness, blisters and sal-ammoniac spots.
- B. Chain-Link Fence Fabric:
1. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with CLFMI Product Manual and with requirements indicated below:
 - a. Comply with recommendations of CLF 2445 for "Standard Industrial".
 - b. Fabric Height: As indicated on Drawings.
 - c. Steel Wire Fabric: Wire with a diameter of 0.148 inch minimum.
 - 1) Mesh Size: 2 inches.
 - 2) Zinc-Coated Fabric: ASTM A 392, Class 2, 2.0 oz./sq. ft.
 - 3) Coat selvage ends of fabric that is metallic coated before the weaving process with manufacturer's standard clear protective coating.
 - d. Selvage: Twisted top and knuckled bottom.
- C. Rails (Top, Bottom, Side, and Intermediate): ASTM F1083, Grade SK-40A, round, zinc-coated steel. Dimensions and weights of posts shall conform to the tables in the ASTM Specification; fitted with suitable expansion sleeves and means for securing rail to each gate, corner, and end posts.
- D. Tension Wire: ASTM A817 and ASTM F626, zinc-coated, having minimum coating the same as the fence fabric.
- E. Barbed wire shall not be used on any part of the fence.
- F. Concrete: ASTM C94/C94M, using 19 mm (3/4 inch) maximum-size aggregate, and having minimum compressive strength of 25 mPa (3000 psig) at 28 days. Non-shrinking grout shall consist of one part Portland cement to three parts clean, well-graded sand, non-shrinking grout additive and the minimum amount of water to produce a workable mix.
- G. Reinforcing: Provide per approved shop drawings, and where directed by Professional Engineer.
- H. Posts: ASTM F1083 and ASTM F 1184, Grade SK-40A, round, zinc-coated steel. Dimensions and weights of posts shall conform to the tables in the ASTM Specification. Provide post braces and truss rods for each gate, corner, pull or end post. Provide truss rods with turnbuckles or other equivalent provisions for adjustment.
1. Post Size:
 - a. Corner Post: 3 inch diameter, minimum.
 - b. Line Posts/Typical: 2 inch diameter, minimum.
 - c. Posts supporting vehicular gates shall be sized, braced, aligned and properly embedded with concrete post footers to ensure solid and structurally-sound support of these gate posts and proper operation of the gates.
 2. Horizontal Brace Rail: 1-5/8 inch outside diameter at 4 feet above grade.

3. Truss Rod: 3/8 inch diameter, minimum. Truss rod shall form triangle with vertical posts and gate tube; and with vertical posts, and top and bottom rails.

2.2 GATES

- A. Overhead Sliding: Comply with ASTM F 1184 for gate posts and sliding gate.
 1. Classification: Type 1 – Overhead Slide.
 2. Operation: Manual.
 3. Clear Opening Height: 11'-0".
 4. Gate Leaf Opening: As shown on drawings.
 5. Comply with ASTM F 1184 for gate posts and sliding gate types.
 6. Gate Post: 4 inch diameter, minimum.
- B. Frame Corner Construction: Welded or assembled with corner fittings.
- C. Overhead Track Assembly: Manufacturer's standard track, with overhead framing supports, bracing, and accessories, engineered to support size, weight, width, operation, and design of gate and roller assemblies.
 1. Gate Hardware: Manufacturer's standard products, installed complete.
 2. Equip gate openings with magnetic lock. Card reader specified elsewhere.

2.3 ACCESSORIES

- A. Accessories: Accessories as necessary for a complete installation including but not limited to the following:
 1. Caps, rail and brace ends, wire ties or clips, braces and tension bands, tension bars, truss rods, and miscellaneous accessories conforming to ASTM F626.

2.4 FINISHES

- A. General: All surfaces shall be galvanized.

2.5 FABRICATION

- A. Comply with manufacturer's recommendations.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fence: Provide chain link fence, with gates, as shown on drawings.
- B. Posts: Fence posts shall be properly embedded in a concrete footing to ensure structural support for the fabric. Install fence posts in accordance with ASTM F567 and ASTM F1184, and as follows:
 1. Mountings shall be designed by engineer per Quality Assurance in PART 1

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2. Corner Posts and Gate Posts: Brace gate post to adjacent posts each way, four braces per corner post and gate post.
 3. Install posts plumb and in alignment. Set post in footings as described above. Thoroughly compact concrete so as it to be free of voids and finished in a slope or dome to divert water running down the post away from the footing. Straight runs between braced posts shall not exceed 500 feet. Cure concrete and grout a minimum of 72 hours before any further work is done on the posts.
- C. Post Caps: Fit all exposed post ends with caps. Provide caps that fit snugly and are weathertight. Where top rail is used, provide caps to accommodate the top rail. Install post caps as recommended by the manufacturer and as shown.
 - D. Tension Wire: Install and pull taut tension wire before installing the chain-link fabric.
 - E. Accessories: Supply accessories posts braces, tension bands, tension bars, truss rods, and miscellaneous accessories, as required and recommended by the manufacturer, to accommodate the installation of a complete fence, with fabric that is taut and attached properly to posts, rails, and tension wire.
 - F. Fabric: Pull fabric taut and secured with wire ties or clips to the and tension wire close to both sides of each post and at intervals of not more than 600 mm (24 inches) on centers. Secure fabric to posts using stretcher bars and ties or clips.
 - G. Gates/Access Panels: Install gates according to manufacturer's written instructions plumb, level, and secure for full opening without interference. Set keepers, stops and other accessories into concrete as required by the manufacturer. Adjust hardware for smooth operation and lubricate where necessary. Attach hardware using tamper-resistant or concealed means.
 1. Magnetic Locks: Leave ready for card reader and electrical connection to lockset under Division 28.
- 3.2 FINISH
- A. All surfaces shall be galvanized.
- 3.3 REPAIR OF GALVANIZED SURFACES
- A. Use galvanized repair compound, stick form, or other method, where galvanized surfaces need field or shop repair. Repair surfaces in accordance with the manufacturer's printed directions.
- 3.4 CLEAN-UP AND MATERIAL MOVING
- A. Clean finish surfaces prior to acceptance of the work.

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