SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the requirements for furnishing and installing the following:

1. Polyvinyl chloride (PVC) coated steel chain link fence and gates at entry to Service/Delivery area.

B. Related Sections:

1. Gate operators are specified in Section 32 31 13.73.

1.02 SUBMITTALS

A. Product Data: Manufacturer's technical data, specifications, and installation instructions for fence and gate posts, fabric, gates, and accessories.

B. Shop Drawings: Show location of fence, gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.

C. Samples for initial selection of PVC color in form of manufacturer's color charts or 6-inch lengths of actual fabric wire showing colors available.

1.03 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain chain link fences and gates as complete units, including necessary erection accessories, fittings, and fastenings from a single source or manufacturer.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the Project site in an undamaged conditions.

B. Store materials off the ground to provide protection against oxidation caused by ground moisture.

PART 2 - PRODUCT

2.01 APPROVED MANUFACTURERS

A. American Fence Company, Anchor Fence, Inc., Colorguard Fence Products, Inc., Cyclone Fence Div./USX Corp., Semmerling Fence & Supply, Inc. or approved equal.

2.02 FABRIC

A. Steel Fabric: Comply with Chain Link Fence Manufacturers Institute (CLFMI) Product Manual. Furnish one-piece fabric widths for fencing up to 12-feet high. Wire size includes zinc or aluminum coating.

1. Size: 3/4- or 1-inch mesh, 11-gage (0.120-inch diameter) wire.

2. Polyvinyl Chloride (PVC) Finish: Comply with ASTM F668, with core wire diameter (gage) measured prior to application of PVC coating with not less than 0.40-oz. zinc per sq. ft. of uncoated surface on 6-gage wire and not less than 0.30-oz. zinc per sq. ft. of uncoated surface on 9- and 11-gage wire. Manufacturer’s standard black color.

2.03 FRAMING

A. Strength requirements for posts and rails conforming to ASTM F1043.

B. Pipe shall be straight, true to section, material, and sizes specified, and shall conform to the following weights per foot:

Pipe Size Outside Diameter	Group IA Steel	Group IC Steel
1-5/8	2.27	1.84
1-7/8	2.72	2.28
2-3/8	3.65	3.12
2-7/8	5.79	4.64
3-1/2	7.58	5.71
4	9.11	6.56
6-5/8	18.97	----
8-5/8	24.70	----

C. Steel Framework, General: Posts, rails, braces, and gate frames.

1. Group IA Pipe: Hot-dipped galvanized steel pipe conforming to ASTM F1083, plain ends, standard weight (schedule 40) with not less than 1.8-oz. zinc per sq. ft. of surface area coated.

2. Group IC Pipe: Manufactured from steel conforming to ASTM A1011 or A653, grade D, cold formed, electric welded with minimum yield strength of 50,000-psi and triple coated with minimum 0.9-oz. zinc per sq. ft. after welding, a chromate conversion coating and a clear polymer overcoat. Corrosion protection on inside surfaces shall protect the metal from corrosion when subjected to the salt spray test of ASTM B117 for 300-hours with the end point of 5-percent Red Rust.

3. Polyvinyl Chloride (PVC) Finish: Provide framework, fittings, and accessories with manufacturer's standard polyvinyl chloride (PVC) plastic resin finish thermally bonded and adhered to a cured primer applied over zinc-coated steel, not less than 10-mils (0.010-inch) thick. Color to match chain link fabric.

D. End, corner, and pull posts for following fabric heights:

1. Up to 6-feet: 3-3/8-inch OD Group IA or Group IC steel pipe.

2. 6- to 9-feet: 2-7/8-inch OD Group IA or Group IC steel pipe.

3. Over 9-feet: 4-inch OD Group IA or Group IC steel pipe.

F. Line or intermediate posts for following fabric heights:

1. Up to 6-feet: 1-7/8-inch OD Group IA or Group IC steel pipe.

2. 6- to 9-feet: 2-2/8-inch OD Group IA or Group IC steel pipe.

3. Over 9-feet: 2-7/8-inch OD Group IA or Group IC steel pipe.

G. Gate Posts: Furnish posts for supporting single gate leaf, or one leaf of a double gate installation, for nominal gate widths as follows:

1. Single Gates:

a. Up to 6-feet: 2-7/8-inch OD Group IA or Group IC steel pipe.

b. Over 6-feet to 13-feet: 4-inch OD Group IA or Group IC steel pipe.

c. Over 13-feet to 18-feet: 6-5/8-inch OD Group IA steel pipe.

d. Over 18-feet: 8-5/8-inch OD Group IA steel pipe.

2. Double Gates:

a. Up to 12-feet: 2-7/8-inch OD Group IA or Group IC steel pipe.

b. Over 12-feet to 24-feet: 4-inch OD Group IA or Group IC steel pipe.

c. Over 24-feet to 36-feet: 6-5/8-inch OD Group IA steel pipe.

d. Over 36-feet: 8-5/8-inch OD Group IA steel pipe.

H. Top Rail: Manufacturer's longest lengths, with expansion-type couplings, approximately 6-inches long, for each joint. Provide means for attaching top rail securely to each gate corner, pull, and end post.

1. Galvanized Steel: 1-5/8-inch OD Group IA or Group IC steel pipe.

2.04 FITTINGS AND ACCESSORIES

A. Material: Comply with ASTM F626. Mill-finished aluminum or galvanized iron or steel, to suit manufacturer's standards.

1. Zinc Coating: Unless specified otherwise, galvanize steel fence fittings and accessories in accordance with ASTM A153, with zinc weights per Table I.

B. Tie Wires: 12-gage (0.106-inch diameter) galvanized steel with a minimum of 0.80-oz. per sq. ft. of zinc coating of surface area in accordance with ASTM A641, Class 3 or 9-gage (0.106-inch-diameter) aluminum wire alloy 1100-H14 or equal, to match fabric core material.

C. Bottom and Center Rail: Same material as top rail. Provide manufacturer's standard galvanized steel or cast iron or cast aluminum cap for each end.

D. Post and Line Caps: Provide weathertight closure cap for each post. Provide line post caps with loop to receive tension wire or top rail.

E. Tension or Stretcher Bars: Hot-dip galvanized steel with minimum, length 2-inches less than full height of fabric, minimum cross-section of 3/16-inch by 3/4-inch and minimum 1.2-oz. zinc coating per sq. ft. of surface area. Provide one bar for each gate and end post, and two for each corner and pull post, except where fabric is integrally woven into post.

F. Tension and Brace Bands: Minimum 3/4-inch-wide hot-dip galvanized steel with minimum 1.2-oz. zinc coating per sq. ft. of surface area.

1. Tension Bands: Minimum 14-gage (0.074-inch) thick.

2. Tension and Brace Bands: Minimum 12-gage (0.105-inch) thick.

2.05 GATES

A. Fabrication: Fabricate perimeter frames of gates from metal and finish to match fence framework. Assemble gate frames by welding. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frame members maximum of 8-feet apart.

1. Provide same fabric as for fence. Install fabric with tension bars and bands at vertical edges and at top and bottom edges.

2. Install diagonal cross-bracing consisting of 3/8-inch-diameter adjustable-length truss rods on gates to ensure frame rigidity without sag or twist.

B. Swing Gates: Comply with ASTM F900.

1. Fabricate assembly of 1-7/8-inch OD Group IA or Group IC steel pipe with welded joints. Weld areas repaired with zinc-rich coating applied in accordance with manufacturer's instructions.

2. Gate Hardware: Provide hardware and accessories for each gate, galvanized per ASTM A153, and in accordance with the following:

a. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180-deg gate opening. Provide 1-1/2 pair of hinges for each leaf over 6-foot nominal height.

b. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.

C. Sliding Gates: Comply with ASTM F1184. Provide heavy-duty inverted channel track, ball-bearing hanger sheaves, overhead framing and supports, guides, stays, bracing, hardware, and accessories as required.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Install fence in compliance with ASTM F567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

1. Apply fabric to outside of framework.

B. Excavation: Drill or hand-excavate (using post-hole digger) holes for posts in firm, undisturbed or compacted soil. Core drill holes through concrete paving where required.

1. Excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than 4-times largest cross-section of post.

2. Excavate hole depths approximately 3-inches lower than post bottom, with bottom of posts set not less than 36-inches below finish grade surface.

C. Setting Posts: Center and align posts in holes 3-inches above bottom of excavation. Space maximum 10-feet o.c. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

D. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs and at other posts terminating into rail end attached to posts or post caps fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.

E. Center Rails: Install in one piece between posts and flush with post on fabric side, using rail ends and special offset fittings where necessary.

F. Fabric: Leave approximately 2-inches between finish grade or paving and bottom selvage. Pull fabric taut and tie to posts and rails. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

G. Tension or Stretcher Bars: Thread through or clamp to fabric 4-inches o.c., and secure to end, corner, pull, and gate posts with tension bands spaced not over 15-inches o.c.

H. Tie Wires: Use U-shaped wire of proper length to secure fabric firmly to posts and rails with ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing.

1. Maximum Spacing: Tie fabric to line posts 12-inches o.c. and to rails and braces 24-inches o.c.

I. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

J. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

END OF SECTION