

SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Vinyl coated chain link fences, gates and accessories.

1.2 REFERENCE SPECIFICATIONS AND DOCUMENTS

- A. American Society for Testing Materials (ASTM)
 - 1. ASTM C1107 – Cement grout.
 - 2. ASTM F567 – Installation of chain link fence.
 - 3. ASTM F626 – Fence fittings.
 - 4. ASTM F900 – Commercial swing gates.
 - 5. ASTM F934 – Standard colors for polymer-coated chain link fence.
 - 6. ASTM F1043 – Protective coatings on steel fence framework.
 - 7. ASTM F1083 – Galvanizing for fence structures
 - 8. ASTM F1664 – PVC coated steel wire.

1.3 SUBMITTALS

- A. Manufacturer's literature and data: Cut sheets or specifications indicating material compliance and specified options for chain link fencing, gates, privacy slats (where applicable) and all accessories.
- B. Shop drawings: Site plan showing layout of fence location with dimensions, location of gates and opening size, cleared area, elevation of fence and gates, details of attachments and footings.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company having manufacturing facility/facilities specializing in manufacturing chain link fence products with at least 5 years' experience.
- B. (Sub) Contractor: Demonstrated successful experience installing similar projects and products in accordance with ASTM F567 and have at least 5 years' experience.

1.5 SITE CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures.

PART 2 - PRODUCTS

2.1 CHAIN LINK FABRIC

- A. Fabric height: Fabric height shall be as noted on the Drawings.
- B. Fabric shall be PVC coated galvanized steel wire fabric provided in one-piece heights complying to ASTM F 668, Class 2a.
- C. Mesh size:
 - 1. Fencing mesh size (except tennis): 2 inches.
 - 2. Tennis court fencing mesh size: 1-3/4 inches.
- D. Core wire diameter: 0.148 inches (9 gauge).
- E. PVC coating: 6 gauge finished diameter with a minimum thickness of 0.015 inches applied in accordance with ASTM F 1043.
- F. PVC coating color: Black, per ASTM F 934.
- G. Selvages: Knuckled top selvage and knuckled bottom selvage.

2.2 FENCE FRAMING

- A. Posts and rails: Comply with ASTM F 1043 for framing, ASTM F 1083 for Group IC round pipe, and the following:
 - 1. Group: IA, round steel pipe, Schedule 40.
 - 2. Fence height shall be as noted on the Drawings.
 - 3. Strength requirement: Light industrial according to ASTM F 1043.
 - 4. Post diameter, thickness and weight:
 - a. Fence heights 4 to 6 feet
 - Line post: 2.375 inches (2-3/8" nominal o.d.), 0.154 inches, 3.65 lb/ft.
 - End, corner and pull post: 2.875 inches (2-7/8" nominal o.d.), 0.203 inches, 5.79 lb/ft.
 - b. Fence height 8 to 10 feet:
 - Line post: 2.875 inches (2-7/8" nominal o.d.), 0.203 inches, 5.79 lb/ft.
 - End, corner and pull post: 4.000 inches (4" nominal o.d.), 0.237 inches, 10.80 lb/ft.
 - c. Swing gate post: According to ASTM F 900
 - 5. Top rails, rails and braces diameter and thickness:
 - a. Top Rails: 1.90 inches (1-7/8" nominal o.d.), 0.145 inches, 2.72 lb/ft.
 - b. Rails and braces: 1.66 inches (1-5/8" nominal o.d.), 0.140 inches, 2.27 lbs/ft.
 - 6. Coating for steel framing: PVC coated finish in accordance with ASTM F 1043 applied with a minimum thickness of 10-mils in black color to match the fabric.

2.3 TENSION WIRE

- A. PVC coated 0.177 inch diameter (7 gauge) metallic coated steel core wire complying with ASTM F 1664 Class 2a.

2.4 SWING GATES

- A. General: Comply with ASTM F 900 for swing gate types.
 - 1. Metal pipe and tubing: Galvanized steel gate framing complying with ASTM F 1043 and ASTM F 1083.
 - 2. Coating for steel framing: PVC coated finish in accordance with ASTM F 1043 applied with a minimum thickness of 10-mils in black color to match the fabric.
- B. Frames and bracing: Fabricate members from round, tubing with outside dimension and weight according to ASTM F 900 and the following:
 - 1. Gate Fabric Height: 2 inches less than adjacent fence height.
 - 2. Leaf Width: As indicated.
 - 3. Frame Members Diameter: 1.90 inches.
- C. Frame corner construction: Welded or assembled with corner fittings.
- D. Hardware: Latches permitting operation from both sides of gate, hinges, and keepers for each gate leaf more than 5 feet wide. Fabricate latches with integral eye openings for padlocking; padlock accessible from both sides of gate.

2.5 FITTINGS

- A. General:
 - 1. Comply with ASTM F 626.
 - 2. Coating for fittings: PVC coated finish applied with a minimum thickness of 10-mils in black color to match the fabric.
- B. Tension and brace bands: PVC coated 12 gauge galvanized pressed steel a minimum width of $\frac{3}{4}$ inch.
- C. Top rail sleeves: PVC coated pressed-steel or round-steel tubing not less than 6 inches long.
- D. Tie wires and hog rings: PVC coated nine 9 gauge galvanized steel or aluminum core wire for attachment of fabric to framing and tension wire.
- E. Truss rods and tightener:
 - 1. PVC coated steel rods with minimum diameter of $\frac{3}{8}$ inch.
 - 2. PVC coated pressed steel tightener.
- F. Terminal post caps, line post loop tops, rail and brace ends, and boulevard clamps: PVC coated galvanized pressed steel.

2.6 GROUT AND ANCHORING CEMENT:

- A. Grout for post footings in concrete, masonry, or bedrock: Non-shrink grout complying with ASTM C 1107.
- B. Concrete for post footings in soil: 28 day compressive strength of 3,000 psi (minimum).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for conditions for compliance with requirements for site clearing, grading, paving, and other conditions affecting performance of the work.
- B. Do not begin installation before final grading and clearing is completed.

3.2 PREPARATION

- A. Mark locations of fence lines, gates, and terminal posts.
- B. Clear, grub, grade, and remove debris for the fence line.

3.3 INSTALLATION

- A. General:
 - 1. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.
 - 2. Install fencing on established boundary lines inside property line.
- B. Excavation:
 - 1. Drill holes for post footings in firm undisturbed or compacted soil.
 - 2. Bedrock excavation: if bedrock is encountered before reaching required depth, excavate to required depth for setting post in soil or 18 inches, whichever is less, and provide a 2 inch larger diameter than the outside diameter of the post.
 - 3. Clear loose material, fine grade area around finished post footings and uniformly spread and stabilize excavated material on site.
- C. Terminal post locations:
 - 1. Install terminal line posts at each fence termination and change in horizontal or vertical direction of 30° or more.
- D. Line post spacing:
 - 1. For fence heights of 4 to 8 feet, space line posts uniformly 10 feet on center
 - 2. For fence heights of 10 feet, space line posts 8 feet on center
- E. Setting Posts:
 - 1. Set post in soil: Set posts in concrete footing.
 - a. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - b. Footing depths.
 - Fence heights of 4 to 6 feet, footing depth shall be 36".
 - Other fence heights footing depth shall be a minimum of 24" plus an additional 3 inches for each 1 foot increase in the fence height over 4 ft., unless otherwise noted.
 - c. Footing diameters based on diameter of fence post.
 - 3 inch fence post- footing diameter is 12 inches.
 - 4 inch fence post- footing diameter is 16 inches.
 - Other fence heights footing diameter is a minimum of 4 times greater than O.D. of post, unless otherwise noted.

- d. Set post 3 inches above bottom of footing excavation.
Install "Fence Foot" as distributed by Fence Foot | 830 Crossfire Ridge | Marietta, GA 30064 | www.thefencefoot.com to the bottom of the post **<OR>**
Install 3" of #57 stone in bottom of footing.
 - e. Thoroughly consolidate concrete into the hole to remove voids.
 - f. Finish top of concrete sloping away from post for positive drainage.
 2. Set post in bedrock: Set posts in non-shrink grout.
 - a. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with non-shrink grout or mechanical devices.
 - b. Footing depth shall be per bedrock excavation requirements listed above.
 - c. Footing diameter is a minimum of 2 inches greater than O.D. of post, unless otherwise noted.
 - d. Set posts 3 inches above bottom of footing excavation.
Install "Fence Foot" as distributed by Fence Foot | 830 Crossfire Ridge | Marietta, GA 30064 | www.thefencefoot.com to the bottom of the post **<OR>**
Install 3" of #57 stone in bottom of footing.
 - e. Thoroughly consolidate non-shrink grout into the hole to remove voids.
 - f. Finish top of grout sloping away from post for positive drainage.
 3. Set posts in structures:
 - a. Set posts in steel sleeves with non-shrink grout.
 - b. Install post in concrete retaining walls, curbs, slabs, or similar construction in galvanized pipe sleeves set into the concrete or built into the masonry as shown on the drawings.
 - c. Sleeve depth and diameter shall be as noted on drawings.
 - d. Set sleeves plumb and one-half inch above the finished structure.
 - e. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - f. Thoroughly compact non-shrinking grout between sleeve and post.
 - g. Finish top of grout to divert stormwater away from the post.
 4. Gate Posts:
 - a. Gate posts require larger footings than listed above.
 - b. Gate post footing dimensions to comply with ASTM F 567.
 - F. Post Bracing and Intermediate Rails:
 1. Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts.
 2. Locate horizontal braces at mid height of fabric 6 feet or higher, on fences with top rail and at 2/3 fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
 3. For fence height of 10 feet, install an intermediate rail at a height of 5'-0".
 - G. Tension Wire:
 1. Install according to ASTM F 567, maintaining plumb position and alignment of fencing.
 2. Install tension wire 4 inches up from the bottom of the fabric.
 3. Pull wire taut, without sags.
 4. Secure tension wire to terminal post using a brace band.
 5. Install tension wire in locations indicated before stretching fabric.

- H. Top Rail:
 - 1. Install according to ASTM F 567, maintain a plumb position and alignment of fencing.
 - 2. Install twenty one 21 foot lengths of rail continuously through line post caps, bending to radius for curved runs and terminating into terminal post by a brace band and rail end.
 - 3. Splice rail using top rail sleeves.
- I. Bottom Rails:
 - 1. Install and secure to posts with fittings, in locations indicated on the drawings.
- J. Chain-Link Fabric:
 - 1. Apply fabric to outside of the framework.
 - 2. Leave approximately 1 inch, without exceeding 2 inches, between finish grade or surface and bottom selvage, unless otherwise noted.
 - 3. Pull fabric taut and anchor to framework so fabric remains under tension after pulling force is released.
 - 4. Attach to terminal post by threading the tension bar through the fabric; secure the tension bar to the terminal post with tension bands and 5/16 in. carriage bolts spaced no greater than 12 inches on center
 - 5. Secure fabric to the line post with tie wires spaced no greater than 12 inches on center.
 - 6. Secure fabric to rail with tie wires spaced no greater than 18 inches on center.
 - 7. Secure fabric to the tension wire with hog rings spaced no greater than 24 inches on center.
- K. Tension or Stretcher Bars:
 - 1. Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches on center
- L. Tie Wires:
 - 1. Use wire of proper length to firmly secure fabric to line posts and rails.
 - 2. Attach wire at 1 end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626.
 - 3. Bend ends of wire to minimize hazard to individuals and clothing.
- M. Fasteners:
 - 1. Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side.
 - 2. Peen ends of bolts or score threads to prevent removal of nuts.
- N. Swing Gates:
 - 1. Install swing gates and gateposts per ASTM F567.
 - 2. Direction of swing shall be as indicated on the drawing.
 - 3. Install gates shall be plumb in the closed position having a bottom clearance of 3 inches grade permitting.
 - 4. Hinge and latch offset opening space from the gate frame to the post shall be no greater than 3 inches in the closed position.
 - 5. Double gate drop bar receivers shall be set in a concrete footing minimum 6 inches diameter and 24 inches deep.
 - 6. Gate leaf holdbacks shall be installed for all double gates.

3.4 CLEAN UP

- A. Clean up the area of the fence line shall be left neat and free of any debris caused by the installation of the fence.

END OF SECTION