

SECTION 32 31 13
CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fence framework, fabric, and accessories.
2. Excavation for post bases.
3. Concrete foundation for posts and center drop for gates.
4. Manual gates and related hardware.
5. Barbed wire, 3 strand on fence top.

1.2 REFERENCES

A. ASTM International:

1. ASTM A121 - Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
4. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
5. ASTM A491 - Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric.
6. ASTM A585 - Standard Specification for Aluminum-Coated Steel Barbed Wire.
7. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
8. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
9. ASTM B429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
10. ASTM F567 - Standard Practice for Installation of Chain-Link Fence.
11. ASTM F668 - Standard Specification for Poly (Vinyl Chloride) (PVC)-Coated Steel Chain Link Fence Fabric.
12. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates.
13. ASTM F934 - Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials.
14. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
15. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
16. ASTM F1183 - Aluminum Alloy Chain Link Fence Fabric.
17. ASTM F1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.

B. Chain Link Fence Manufacturers Institute:

1. CLFMI - Product Manual.

C. SCDOT Standard Specifications:

1. Standard Specifications for Highway Construction, 2007, published by the South Carolina Department of Transportation.

1.3 SYSTEM DESCRIPTION

- A. Fence Height: As indicated on Drawings.
- B. Line Post Spacing: As indicated on Drawings, 12 feet maximum.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.
- C. Product Data: Submit data on fabric, posts, accessories, fittings and hardware.
- D. Manufacturer's Installation Instructions: Submit installation requirements including post foundation anchor bolt templates if required.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines and easements.
- C. Operation and Maintenance Data: Procedures for submittals.

1.6 QUALITY ASSURANCE

- A. Supply material in accordance with CLFMI - Product Manual.
- B. Comply with Section 806 of SCDOT Standard Specifications except as modified herein. Maintain one copy of document on site.
- C. Perform installation in accordance with ASTM F567.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 5 years experience.
- B. Installer: Company specializing in performing work of this section with minimum 5 years experience.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.
- B. Identify each package with manufacturer's name.
- C. Store fence fabric and accessories in secure and dry place.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Pipe Framing: ASTM F1083 Schedule 40 galvanized steel pipe, welded construction; coating conforming to ASTM F1043 Type A on pipe exterior and interior.
- B. Hot Rolled Steel Framing: ASTM A1011 hot rolled steel strip, cold formed to pipe configuration, longitudinally welded construction, minimum Grade 50; coating conforming to ASTM F1043 Type B on pipe exterior and interior.
- C. Steel Fence Fabric: ASTM A392 zinc coated wire fabric or ASTM A491 aluminum coated wire fabric. [ASTM F668 PVC coated.]
- D. Aluminum Alloy Pipe Framing: ASTM B429.
- E. Aluminum Alloy Fence Fabric: ASTM F1183
- F. Barbed Wire: ASTM A121 galvanized steel or ASTM A585 aluminum coated steel; 12 gage thick wire, 2 strands, and 4 points at 3 inch on center.
- G. Concrete: Class A concrete in accordance with Section 701 of SCDOT Standard Specifications with 3000 psi compressive strength at 28 days.

2.2 COMPONENTS

- A. Nominal fence height less than 6 feet:
 - 1. Line Posts: 1.9 inch diameter.
 - 2. Corner and Terminal Posts: 2.88 inch.
 - 3. Gate Posts: 3.5 inch diameter.
 - 4. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.
 - 5. Gate Frame: 1.66 inch diameter for welded fabrication.
- B. Nominal Fence height 6 feet or more:
 - 1. Line Posts: 2.38 inch diameter.
 - 2. Corner and Terminal Posts: 3.5 inch.
 - 3. Gate Posts: 4.5 inch diameter.
 - 4. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.
 - 5. Gate Frame: 1.66 inch diameter for welded fabrication.
- C. Fabric: 2 inch diamond mesh interwoven wire, 11 gage thick steel, 9 gage thick aluminum, top selvage knuckle end closed, bottom selvage knuckle end closed.
- D. Tension Wire: 7 gage thick steel, single strand.
- E. Tension Band: 3/16 inch thick by 3/4 inch wide steel.
- F. Tie Wire: Aluminum steel wire, 9-gage or 6-gage as indicated.

2.3 ACCESSORIES

- A. Caps: Cast steel galvanized, galvanized pressed steel, malleable iron galvanized, or aluminum alloy; sized to post diameter, set screw retainer.

- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; galvanized steel.
- C. Extension Arms: Cast steel galvanized or galvanized pressed steel to accommodate 3 strands of barbed wire, single arm, for placing vertical or sloped to 45 degrees as indicated on Drawings.
- D. Gate Hardware: Fork latch with gravity drop, center gate stop and drop rod; two 180 degree gate hinges for each leaf and hardware for padlock keyed to match hardware as directed by Architect/Engineer.

2.4 GATES

- A. General:
 - 1. Gate Types, Opening Widths and Directions of Operation: As indicated on Drawings.
 - 2. Design gates for operation by one person.
 - 3. Deliver gates factory assembled.
 - 4. Finish is to be galvanized, aluminum coated, or PVC coated to match fence.
- B. Swing Gates:
 - 1. Fabricate gates to permit 180 degree swing.
 - 2. Gates Construction: ASTM F900 with welded corners. Use of corner fittings is not permitted.

2.5 FINISHES

- A. Galvanized Components and Fabric: Galvanized to ASTM A123/A123M for components; ASTM A153/A153M for hardware; ASTM A392 for fabric; 2.0 oz/sq. ft. coating.
- B. Aluminum Coated Components and Fabric: Aluminum coating to ASTM A792/A792M for components and ASTM A491 for fabric; 0.40 oz/sq. ft.
- C. Vinyl Coated Components and Fabric: Vinyl coating, 10 mil thick, over metallic coated wire, medium green, dark green or black color in accordance with ASTM F934 as indicated on Drawings.
- D. Hardware: Galvanized to ASTM A153/A153M, 2.0 oz/sq. ft. coating.
- E. Accessories: Same finish as framing.

2.6 CONCRETE

- A. Concrete for foundations: Class A Concrete conforming to Section 701 of the SCDOT Standard Specifications.
 - 1. Compressive strength of 3,000 psi at 28 days.
 - 2. Air entrained.
 - 3. Water cement ratio of 0.488 with rounded aggregate and 0.532 with angular aggregate.
 - 4. Maximum slump of 3.5 inch for non-vibrated concrete and 4 inch for vibrated concrete.
 - 5. Minimum cement content of 564 lbs per cubic yard for non-vibrated and 602 lbs per cubic yard for vibrated concrete.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install framework, fabric, accessories, and gates in accordance with ASTM F567.
- B. Set intermediate, terminal, gate, and corner posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.
- C. Footing Depth from Finished Grade:
 - 1. Line Posts for Nominal Fence Height Less Than 6 Feet: 2.25 feet.
 - 2. Line Posts for Nominal Fence Height 6 Feet or More: 2.5 feet.
 - 3. Corner, Gate, Pull, and Terminal Posts: 3 feet.
- D. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
- E. Install top rail through line post tops and splice with 6 inch long rail sleeves.
- F. Install center and bottom brace rail on corner gate leaves.
- G. Place fabric on outside of posts and rails.
- H. Do not stretch fabric until concrete foundation has cured 28 days.
- I. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- J. Position bottom of fabric 2 inches above finished grade.
- K. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.
- L. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- M. Install bottom tension wire stretched taut between terminal posts.
- N. Install support arms sloped inward, outward, or vertical as indicated and attach barbed wire; tension, and secure.
- O. Support gates from gate posts. Do not attach hinged side of gate from building wall.
- P. Install gate with fabric and barbed wire overhang to match fence. Install three hinges on each gate leaf. Install latch, catches, and drop bolt.
- Q. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.
- R. Connect to existing fence at an existing terminal post, new terminal post, or an existing line post converted to terminal post by installation of brace rails and brace rods.
- S. Install posts with 6 inches maximum clear opening from end posts to buildings, fences, and other structures.

- T. Excavate holes for posts to diameter and spacing indicated on Drawings without disturbing underlying materials.
- U. Center and align posts. Place concrete around posts, and vibrate or tamp for consolidation. Verify vertical and top alignment of posts and make necessary corrections.
- V. Extend concrete footings 1 inch above grade and trowel, forming crown to shed water.
- W. Allow footings to cure minimum 7 days before installing fabric and other materials attached to posts.

3.2 ERECTION TOLERANCE

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/4 inch.
- C. Maximum Offset from Indicated Position: 1 inch.
- D. Minimum distance from property line: 6 inches.

END OF SECTION