

SECTION 32 31 13
CHAIN LINK FENCES AND GATES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Fence framework, fabric, and accessories
- B. Excavation for post bases; concrete foundation for posts and center drop for gates.
- C. Manual gates and related hardware.

1.2 RELATED SECTIONS

- A. Section 03 30 00 – Cast-in-Place Concrete

1.3 REFERENCES

- A. ANSI/ASTM A 123 – Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
- B. ANSI/ASTM F 567 – Installation of Chain-Link Fence
- C. ASTM A 116 – Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric
- D. ASTM A 120 – Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized) Welded and Seamless, for Ordinary Uses
- E. ASTM A 121 – Zinc-Coated (Galvanized) Steel Barbed Wire
- F. ASTM A 153 – Zinc-Coating (Hot-Dip) on Iron and Steel Hardware
- G. ASTM A 392 – Zinc-Coated Steel Chain-Link Fence Fabric
- H. ASTM A 428 – Weight of Coating on Aluminum-Coated Iron or Steel Articles
- I. ASTM A 569 – Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip Commercial Quality.
- J. ASTM C 94 – Ready-mixed Concrete
- K. Chain Link Fence Manufacturers Institute (CLFMI) – Product Manual
- L. FS RR-F-191 – Fencing, Wire and Post Metal (and Gates, Chain Link Fence Fabric, and Accessories)

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 00 00.
- B. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.
- C. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.
- D. Samples: Submit two samples of fence fabric, 12x12 inch in size illustrating construction and finish.
- E. Manufacturer's Installation Instructions: Indicate installation requirements, post foundation, and anchor bolt templates.

1.5 PROTECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01 00 00.

- B. Accurately record actual locations of property perimeter posts relative to property lines.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ANSI/ASTM F567.
- B. Maintain one copy of each document on site.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years experience.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Galvanizing:
 - 1. Use zinc for coating that conforms to ASTM B 6 and is at least equal to the grade designated as "Prime Western".
 - 2. Provide a zinc coating for those items indicated or specified to be galvanized as follows:
 - a. ASTM A 153 for galvanizing iron and steel hardware.
 - b. ASTM A 123 for galvanizing roled, pressed and forged steel shapes, plates, bars and strips 1/8 inch thick and heavier.
 - 3. apply zinc on 1/8 inch to 3.16 inch thick steel at a rate of at least 2.0 ounces per square foot of the surface area.
 - 4. Apply zinc on 1/4 inch and thicker steels at a rate of at least 2.3 ounces per square foot with no individual test measuring less than 2.0 ounces per square foot of surface area.
- B. Steel : ASTM A 53.

2.2 CONCRETE

- A. Class 3000 minimum, in accordance with Section 03300.

2.3 POSTS, CAPS, RAILS, COUPLINGS

- A. Posts: Galvanized steel, at the indicated length.
- B. Caps: Pressed galvanized steel or malleable iron designed to fit securely over post ends forming a weather tight closure. Where top rail is used, provide cap to permit passage of top rail. "H" section posts do not require caps.
- C. Top, Intermediate and Bottom Rails: Galvanized steel, in lengths as required. Provide joint coupling to connect rails securely. Provide means for attaching top rail securely to each end, corner, line, slope, and gate posts.
- D. Joint Coupling: Galvanized steel, 6 inches long minimum for each joint. One coupling in 5 shall have expansion spring. Couplings shall be outside sleeve type with bore sleeve true to maintain adjacent lengths of rail in alignment.

POSTS, FRAMES, STIFFENER, RAILS	
PROPOSED USE	NOMINAL TYPE AND SIZE
End, corner, slope and gate posts for single gates 6 feet or less in width and double gate 12 feet or less in width for 1. Fence less than 72 in. high 2. Fence 72 inches or higher	2" pipe 2 ½ " pipe
Gate posts for single swing gates over 6 feet, but not over 13 feet in width and double swing gates over 12 feet, but not over 26 feet in width or for all slide gates with leaves larger than 6 feet	3 ½ " pipe
Gate posts for single swing gate over 13 feet, but not over 18 feet in width and double swing gates over 26 feet, but not over 36 feet in width	6" pipe
Gate posts for single swig gates over 18 feet in width and double swing gates over 36 feet in width	8" pipe
Frame for gates	1 ½ " pipe
Stiffeners for gates	1 ¼ " pipe
Line posts for fences 72 in. or higher	2" pipe
Line posts for fences less than 72 in. high	1 ½ " pipe 1 1/8" x 1 5/8" H
Top Rail	1 ¼ " pipe 1 ½" x 1 ¼ " H
Bottom Rail	6-gage, coiled spring steel tension wire

2.4 CHAIN LINK FABRIC

- A. Eleven gage fabric for all fences less than 60 inches in height and 9 gage for fences over 60 inches conforming to:
 - 1. ASTM A 392 for zinc coated steel fabric.
- B. Unless indicated otherwise use chain link fabric that has approximately 2 inches square mesh and coated after fabrication.
- C. Knuckle finish top edge and twist and barb bottom edge on fabric less than 60 inches wide. For fabric 60 inches or greater in width, twist and barb finish on both edges. Provide fabric that barbing has been done by cutting the wire on the bias.
- D. If indicated, provided fence with slats.

2.5 BARBED WIRE

- A. Two strand, 12-1/2 gage wire with 14 gage, 4 point round barbs spaced approximately 5 inches on center, finished as follows:
 - 1. Galvanized: In accordance with ASTM A 121, Class 3.

2.6 TENSION WIRES AND FABRIC TIES

- A. Tension wires: 7 gage galvanized coil spring steel wire in accordance with ASTM A 641.

- B. Fabric Fasteners: 9 gage galvanized or 6 gage aluminum wire, or approved non-corrosive metal bands, for ties to fasten fabric to posts, rails, and gate frames. Fasten fabric to bottom tension wire spaced 24 inches on center.

2.7 TRUSS OR TENSION BARS

- A. Galvanized steel rod 3/8 inch diameter for truss or tension bars used in trussing gates frames and line posts adjacent in end, corner, slop, or gate posts. When used in trussing line posts, provide adjustment by means of galvanized turnbuckles or other suitable tightening devices.
- B. Tension Bars:
 - 1. Galvanized high carbon steel bars not smaller than 3/16 inch x 3/4 inch tensions bar to fasten fabric to end and corner posts and gate frames. Provide one tension bar for each end post and two for each corner and pull post per section of fabric.
 - 2. Use tension bar bands made from heavy pressed galvanized steel spaced on 15 inch center to secure tension bars to posts.

2.8 FITTINGS AND HARDWARE

- A. Use only galvanized fittings and hardware.
- B. Rivets: Make all hardware attachments with galvanized steel rivets. Refer to ASTM F 626 for additional requirements.

2.9 SUPPORT OR EXTENSION ARM

- A. Use support or extension arms for barbed wire that are of a type that can be attached to tops of the posts and carry the number of wires indicated.
- B. Use only support arms on the fence for barbed wire that are capable of supporting a 250 pound vertical load at the end of the arm without causing permanent deflection.
- C. Single support arms are to be integral with a top post weather cap and have hole passage of top rail when required.

2.10 GATES

- A. Provide additional horizontal and vertical members to ensure proper gate operation and for attachment of fabric, hardware and accessories.
- B. Assemble gate frames and attach hardware by welding or by using fittings and rivets to make rigid connections. Use same fabric as for fence. Install fabric with stretcher bars to gate frame at not more than 15 inch on center.
- C. Provide diagonal cross-bracing consisting of 3/8 inch diameter adjustable length truss rods on gates where necessary to prevent frame from sagging or twisting.

2.11 GATE HARDWARE

- A. Hinges: Pressed steel or malleable iron to suit gate size, non-liftoff type, offset to permit 180 degree gate opening. Provide minimum of one pair of hinges for each leaf.
- B. Latch: Forked steel type of plunger-bar steel type to permit operation from either side of gate. Provide locking device and padlock eye as integral part of latch.

- C. Keeper: Provide keeper for all vehicle gates which automatically engages the gates leaf and holds it in the open position until manually release.
- D. Gate Stops: Mushroom type or flush plate with anchors set in concrete to engage the center drop rod or plunger bar.
- E. Sliding Gates: Manufacturer's standard heavy-duty track, ballbearing hanger sheaves, overhead framing and supports, guides, stays, bracing, steel wheel or rubber wheel, and accessories as required.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Coordinate utility location
- B. Excavate in accordance with Section 31 23 16 Excavation
- C. Refer to ASTM F 567 and CLFMI products manual for chain link fence installation.
- D. Protect existing trees.
- E. Limit the amount of clearing and grading along the fence line to permit proper installation.

3.2 LAYOUT OF WORK

- A. Accurately locate and stake locations and points necessary for installation of fence and gates.
- B. General arrangements and location of fence and gates are indicated. Install except for minor changes required by unforeseen conflicts with work of other trades.

3.3 INSTALLATION OF POSTS

- A. Space line posts as follows:
 - 1. Tangent sections to 500 feet radius: 10 feet maximum
 - 2. 200 feet radius to under 500 feet radius: 8 feet maximum
 - 3. 100 feet radius to under 200 feet radius: 6 feet maximum
 - 4. Under 100 feet radius: 5 feet maximum
- B. Provide pull posts at 500 feet maximum intervals. Changes in line of 30 degrees or more are considered as corners.
- C. Set all posts to true line and grade in concrete bases or in approved pipe sleeves sockets. Check for vertical and horizontal alignment.
- D. Construct concrete bases for posts at least 10 inches in diameter. Place a minimum of 6 inches concrete below each post. Depth of post in concrete as follows:
 - 1. Line Posts: 18 inches
 - 2. End, Pull, Corner and Gate Posts less than 6 inches diameter: 24 inches
 - 3. Gate Posts: 30 inches
- E. Where posts are required to be set in concrete walls or masonry, set sockets for the posts to a depth of at least 18 inches. Use sockets that consist of lengths of 0.048 inch galvanized metal pipe sleeves, with an inside diameter sufficient to allow the posts to fit loosely therein. Coat the inside of the socket and outside of

the posts with an approved bituminous paint. Caulk the posts securely in place with lead wool.

3.4 INSTALLATION OF BRACE ASSEMBLIES

- A. Attached brace rail from end, pull, corner or gate posts to first ensuing line post. Install braces so posts are plumb when diagonal truss rod is under proper tension.

3.5 INSTALLATION OF RAILS

- A. Install rails level and plumb with grade between posts and attached to posts before stretching fabric. Top rails shall form continuous brace from end-to-end of each run of fence.

3.6 INSTALLATION OF FENCE FABRIC

- A. Place fence fabric on security side of posts unless otherwise specified. Place fabric approximately 1 inch above the ground. Maintain a straight grade between posts by excavating high points of the ground. Filling depressions with soil will be permitted only upon approval of Engineer.
- B. Stretch the fabric taut and securely fasten to posts. Fasten to end, gate, corner, and pull posts. Secure stretcher bars with metal bands spaced at 15 inch intervals. Cut the fabric and fasten each span independently at all pull and corner posts. Fasten to line posts with tie wire, metal bands, or other approved methods at 15 inches intervals. Attach the top edge of fabric to the top rail or tension cable at approximately 24 inches intervals. Attach bottom tension wire to fabric with tie wires at 24 inch intervals and secure to the end of pull posts with brace bands.
- C. Draw barbed wire to assure minimum sag at high temperatures and no breakage at low temperature. Connect the wires and arms by means of 0.142 gage galvanized wire stays.

3.7 INSTALLATION

- A. Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage as recommended by the fence manufacturer. Adjust hardware for smooth operation.

3.8 REPAIR OF DAMAGED COATING

- A. Grind smooth and wire brush all welds made after galvanizing to remove loose or burned zinc coating, after which neatly coat the areas with 50-50 solder or as otherwise directed by Engineer. Make repairs to abraded or otherwise damaged zinc coating in a similar manner.

-END OF SECTION-