

CONSTRUCTION STANDARD SPECIFICATION

SECTION 02444

CHAIN LINK FENCES AND GATES

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PART 1 - GENERAL

- 1.01 Chain link fence material shall be produced and installed by methods recognized as good commercial practices in accordance with the Chain Link Fence Manufacturers Institute.
- 1.02 Type of Fence. Chain link fencing shall conform to the requirements stipulated herein. Chain link fencing shall be either buried perimeter fencing or standard fencing as indicated in the contract.
- A. Buried Perimeter Fencing shall be a fence with 8-feet-0-inches of chain link fabric and top and bottom rails. The bottom rail and fabric shall be buried 6 inches below grade. Place three strands of barbed wire on extension arms for a total fence height of 8-feet-6-inches above grade.
 - B. Standard Fencing shall be a fence with 8-feet-0-inches of chain link fabric and top and bottom rails. The bottom rail shall be within two inches above the finish grade. Place three strands of barbed wire on extension arms for a total fence height of 9-feet-0-inches above grade.
 - C. As a general rule, buried perimeter fencing will be used on perimeter fences placed over soil. Standard fencing will be used on non-perimeter fences and for perimeter fences placed over a concrete or asphalt paved surface. Exceptions to this rule will be indicated in the contract.
- 1.02 Relocation of Existing Fence. Any existing fence indicated on the drawings to be removed and relocated shall be taken down, have concrete broken off the posts, and be reinstalled in accordance with these specifications. At no additional cost to Sandia, the contractor may keep the removed posts and install new posts. Splicing posts by welding is not permitted.
- 1.03 Fence Removal for Storage. Fence material shall be stored only when specifically noted in the contract. Any existing fence to be removed and stored for future use shall be taken down and have concrete broken off posts. Posts shall be bundled and tied with wire or strapping tape. Rails shall be bundled in like manner. Fabric shall be rolled, tied and tagged showing length. Separate sections of fabric and wire shall be rolled separately and tagged. All hardware (bolts, nuts, hinges, etc.) that is reusable shall be boxed and tagged as "Fence Hardware." Gates shall remain intact. Material shall be delivered to a warehouse as directed by the inspector.

NOTE: Unless specifically directed by the engineer, all barbed wire shall be taken to salvage. (Reusing barbed wire is dangerous due to its tendency to snap when re-pulled.)

- A. Fence Removal for Salvage. Any existing fence to be removed and turned into salvage shall be handled in the same manner as noted in the previous paragraph except that concrete may be left on the poles.

PART 2 - PRODUCTS

2.01 Concrete shall be at least 2500 psi.

2.02 Fencing Materials. Posts, gate frames, braces, rails, stretcher bars, truss rods and tension wire shall be of galvanized steel. Gate hinges, post caps, barbed wire extension arms, stretcher bar bands, bolts, hardware, and other parts shall be of steel, malleable iron, ductile iron, except that post tops, rail ends, ties and clips may be of aluminum. All fencing, pipe, fabric, and accessories shall conform to the specifications described in the "Product Manual" published by the Chain Link Fence Manufacturers Institute unless further restricted by this section.

- A. Fabric: Fabric shall be ASTM A392, Class 1, zinc coated (1.2 ounces), steel wire/fabric, woven in a 2 inch mesh size, 11-gage (0.120 inches) coated wire size, galvanized before weaving, with twisted barbed selvages top and bottom. No. 11 gauge copper-bearing open-hearth steel wire, woven in a 2-inch mesh, and heavily galvanized by the hot-dip process after weaving.
- B. Pipe: All posts, braces, rails, and gate framing members shall be coated with zinc by the hot-dip process after fabrication. The strip steel used in the manufacture of the pipe shall conform to either ASTM A-120 (Schedule 40) or ASTM A-569 (SS 40 by Allied Tube and Conduit Corp. or equal). Pipe conforming to ASTM A-120 shall receive not less than 1.8 ounces per square foot of zinc coating. Pipe conforming to ASTM A-569 shall be triple coated with a minimum of 0.9 ounces per square foot of zinc, 15 micrograms per square inch of chromate, and 0.3 mils of polyurethane finish. Pipe shall be straight or have an installed deflection not greater than 1/2" per span or post.
- C. Line Posts: All line posts shall be nominal 2-inch, 2.375 inch O.D. steel pipe for fabric height up to 8 feet, and nominal 2-1/2 inch, 2-7/8 inch O.D. for fabric height over 8 feet to 16 feet or less.
- D. Terminal Posts: Angles, corners, Eends, and pull posts shall be nominal 2-1/2 inch, 2.875 O.D. steel pipe for fabric height up to 8 feet, and nominal 3-1/2, 4 inch O.D. for fabric height over 8 feet to 16 feet or less.
- E. Top Rail: All top rails shall be nominal 1-1/4 inch, 1.660 inch O.D. steel pipe. Top rails shall be provided with expansion couplings and shall be securely fastened to gate and terminal posts by means of suitable hot-dipped galvanized connections.
- F. Bottom Rail: All bottom rails shall be nominal 1-1/4 inch, 1.660 inch O.D. pipe.

- G. Bracing: Rails shall be nominal 1-1/4 inch, 1.660 inch O.D. galvanized steel pipe with adjustable truss braces 3/8" in dia. and all fittings hot-dipped galvanized.
- H. Barbed Wire Support Arms: All posts shall be provided with pressed copper-bearing galvanized steel extension arms. All end posts shall be provided with heavy malleable iron extension arms. All extension arms shall be heavily coated with zinc by the hot-dip process. Each extension arm shall be sized to carry three strands of 12-1/2 GA, 4 PT, Class III barbed wire at an angle of 45 degrees, the upper strand 12 inches out from the fence line and 12 inches above the top of the fabric. Arms shall be the type that allow top rail to pass through their bases to form a continuous brace. Barbed wire arms shall be of sufficient strength to withstand a weight of 250 pounds applied at the outer or the top strand of barbed wire.
- I. Barbed Wire: Barbed wire shall be of the four-point pattern, composed of two strands of No. 12-1/2 gauge copper-bearing steel wire, Class III with large hard temper barbs spaced a maximum of 5 inches apart, and shall be heavily galvanized by the hot-dip process.
- J. Tension Bars shall be 3/16 x 3/4-inch hot-dipped galvanized steel.
- K. Fabric Ties shall be minimum No. 11 gauge copper-bearing hot-dipped galvanized steel wire, or similar galvanized steel wire of a tensile strength and gauge not less than that of the main fence fabric.
- L. Gates: Gate frames shall be nominal 1-1/2 inch, 1.900 inch O.D. galvanized high carbon-welded steel tubing with internal bracing of nominal 1-1/4 inch, 1.660 inch O.D., galvanized high carbon-steel tubing welded at all joints to provide rigid water-tight construction. Gate fabric shall match the line fence fabric. Gates shall be 8-feet high with heavy malleable iron extension arms as previously described. Swing gates shall be furnished with pivot-type hinges, center stop, and hold open devices. Gates shall provide clear openings as shown on the drawings. If requested on the submittal list, the contractor shall submit shop and erection drawings on the gates, hardware, type of hangers, spacing, and all other details required for a complete installation. Latches are required only if called for in the contract.
 - 1. Gate Posts. For gates over 4 feet wide, gate posts shall be nominal 3-1/2 inch, 4.00 inch O.D. galvanized steel pipe. The posts shall be provided with heavy malleable iron extension arms as previously described. For gates 4-feet wide and smaller, gate posts may be nominal 2-1/2 inch, 2.875 inch O.D.
- M. Post Caps: Formed Steel, malleable cast iron, or aluminum, sized to post diameter, with set screw retainer.

PART 3 - EXECUTION

- 3.01 Site Preparation: Blade off all fence lines to finish grade before construction of fences.
- 3.02 Erection: The fence erection, including all connections, shall be made in accordance with manufacturer's directions and the "Product Manual" published by the Chain Link Manufacturers Institute.

3.03 Concrete Placement: Posts and gate hold open devices shall be placed in concrete. Concrete shall meet the requirements of Standard Specification 03300 Cast-In-Place Concrete. The contractor shall insure that the fresh concrete has sufficiently cured prior installing and to pulling the fabric.

3.04 Fabric shall be stretched taut enough to resist a 6-inch deflection laterally, top or bottom, when force is exerted with the hand. Fabric shall be attached to and supported by terminal and gate posts by means of 3/16 x 3/4 inch hot-dipped galvanized tension bars.

Fabric shall be fastened to line posts and to the top and bottom rails by means of tie wire (Fabric Ties) spaced approximately two feet apart. There shall be two complete wraps made with the tie wire around the fabric on all perimeter security fences.

Posts bracing, and other structural members shall be located on the inside of the security fence.

The fence and gate fabric for fences 16 feet in height shall be 2 pieces of 8 foot high 11 GA. Material overlapped 4 inches and hog-tied every 12 inches using 112 GA. Galvanized Steel Wire per SNL Standard Drawing CJ1005STD.

3.05 Top Rail shall pass through the extension arms to form a continuous brace from end to end of each stretch of fence.

3.06 Bottom Rail shall be installed in accordance with manufacturer's directions using couplings.

3.07 Bracing: All end and corner posts, unless otherwise shown, shall be suitably braced with pipe set in horizontal position, with adjustable truss braces between terminal and first line posts, complete with all fittings. Terminal posts shall be braced laterally in an approved manner.

3.08 Barbed Wire: Each extension arm shall carry three strands of barbed wire at an angle of 45 degrees, the upper strand 12 inches out from the fence line and 12 inches above the top of the fabric. Install three strands on the extension arms at the top of the fence and over gates. The extension arms shall be installed so that they are pointing to the exterior of the perimeter created by the fence.

3.09 Post Spacing and Setting: All posts shall be spaced in the line of the fence not to exceed 10-foot centers for a fence height not exceeding 8 feet and 8-foot centers for a fence height greater than 8 feet not exceeding 16 feet. All posts shall be set in concrete foundations to a depth of not less than 36 inches for a fence height not exceeding 8 feet, and a minimum of 60 inches for a fence height greater than 8 feet not exceeding 16 feet.

Top of concrete for buried fabric shall be 6-inches below finish grade. Concrete foundations shall be circular in horizontal section, not less than 10-inches in diameter for line posts, and with a diameter not less than the outside diameter of the post plus 9 inches for each gate and terminal post for a fence height not exceeding 8 feet. Concrete

foundations shall be 12-inches in diameter for line posts, and 14-inches in diameter for each gate and terminal post for a fence height greater than 8 feet for a fence height greater than 8 feet but not exceeding 16 feet.

Set terminal posts (end, corner, and gate) at beginning and end of each continuous length of fence and at abrupt changes in vertical and horizontal alignments.

3.10 Bolts and Hardware:

- A. All screws, nuts, bolts, bars, wire mesh, hinges and hinge pins shall be securely fastened to preclude surreptitious removal and assure visual evidence of tampering.
- B. Hardware accessible from outside the area shall be restrained by peening, brazing, or spot welding to preclude removal.
 - 1. Exceptions: Carriage bolts with round head need not be restrained when used to connect top or bottom rail, latches or center stop. Carriage bolts need not be restrained when used on hardware when the nut is not accessible from the outside.
 - 2. Exceptions: Bolts and hardware on fence other than perimeter security fence shall not be restrained unless directed otherwise.

3.11 Painting: Surfaces that have been cut, filed, or where the galvanized coating has been broken damaged shall be coated with a zinc-enriched paintan anti-corrosive aluminum paint or suitable substitute to prevent corrosion per ASTM A 780..

3.12 Clearance:

- A. The bottom rail shall be installed so that it is not over 2 inches above grade at any point. (Standard fence only)
- B. Provide suitable closure at irregularities in grade, such as curbs or ditches.. This can be accomplished with suitable extensions from the bottom rail made from an equivalent material. Vertical posts shall not exceed 6 inches open space to the adjacent post or solid structure. If fabric is utilized in the closure it shall be sufficiently secured to the bottom rail and extensions with fabric ties. Overlap the fabric for the enclosure a minimum of 6 inches above the bottom rail.
- C. Vertical posts shall not exceed 6 inches open space to the adjacent post or solid structure.
- D. Gates in the closed position shall have vertical and horizontal clearances not greater than 6 inches.

- END OF SECTION -