DATE OF THIS VERSION (new)
May 1, 2013

TITLE OF DOCUMENT (new title if applicable):
Chain Link Fences and Gates, 32 31 13

DATE OF VERSION BEING SUPERSEDED (old):
April 1, 2008

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):
Chain Link Fences and Gates, 32 31 13

SUMMARY OF CHANGES IN THIS VERSION:
1.2.A Eliminated description and left only section section reference.
1.2.C&D Added reference to Rough and Finish grading.
Added spec writer note to select items to be used for the site.
1.2 Renumbered.
1.5.B Updated ASTM standards and added new ones.
2.1 Removed ASTM references and referred to section 1.5.
Part 2 Rewrote entire section of products based on current standards and added information about swing gates and horizontal slide gates.
Part 3 Rewrote entire section of execution based on current standards and added information about swing gates and horizontal slide gates..
SECTION 32 31 13
CHAIN LINK FENCES AND GATES

SPEC WRITER NOTES:
Delete or add information between //---// and any other items applicable to project. Cover any item added to the text under Applicable Publications and Products and renumber the paragraphs. Use this section in specifying permanent chain link fence. Specify impermanent type fencing, such as Construction Fence, elsewhere.

PART 1 - GENERAL

1.1 DESCRIPTION
This work consists of all labor, materials, and equipment necessary for furnishing and installing chain link fence, gates and accessories in conformance with the lines, grades, and details as shown.

1.2 RELATED WORK
A. Grounding: Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.
B. Temporary Construction Fence: Section 01 00 00, GENERAL REQUIREMENTS.
C. Rough Grading: Section 31 20 00, EARTH MOVING.
D. Finish Grading: Section 32 90 00, PLANTING.
E. Guard Booths: Section 13 34 19, METAL BUILDING SYSTEMS.
   SPEC WRITER NOTE: Select the pertinent items to be used for the site.
   // F. Card readers and biometric devices: Section 28 13 11, PHYSICAL ACCESS CONTROL SYSTEMS. //
   // G. Intrusion alarm: Section 28 16 11, INTRUSION DETECTION SYSTEM. //
   // H. Security fences: Section 32 31 53, PERIMETER SECURITY FENCES AND GATES. //

1.3 MANUFACTURER'S QUALIFICATIONS
Fence, gates, and accessories shall be products of manufacturers regularly engaged in manufacturing items of type specified.

1.4 SUBMITTALS
A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES, furnish the following:
   1. Manufacturer's Literature and Data: Chain link fencing, gates and all accessories.
2. Manufacturer's Certificates: Zinc-coating complies with complies with specifications.

SPEC WRITER NOTE: The requirement for shop drawings shall be included for special items, such as sliding gates. See TECHNICAL NOTES. Alignment Certification requirement is for property line fencing or similar purpose requiring accurate alignment.

// B. Shop Drawings for __________ // .

// C. Certification that fence alignment meets requirements of contract documents //.

SPEC WRITER NOTE: Update applicable publications to current issue at time of project specifications preparation.

1.5 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

SPEC WRITER NOTE: Delete publications which do not apply to the project.

B. American Society for Testing and Materials (ASTM):
   A121-07 ................. Metallic Coated Carbon Steel Barbed Wire
   A392-07 ................. Zinc-Coated Steel Chain-Link Fence Fabric
   A491-11 ................. Aluminum Coated Steel Chain Link Fence Fabric
   A817-07 ................. Metal-Coated Steel Wire for Chain-Link Fence Fabric and Marcelled Tension Wire
   C94-12 ................. Ready-Mixed Concrete
   F567-11a ............... Installation of Chain-Link Fence
   F626-08 ............... Fence Fittings
   F668-11 ............... Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain Link Fence Material
   F1184-05 ............... Industrial and Commercial Horizontal Slide Gates
   F1664-08 ............... Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer Coated Steel Tension Wire used with Chain Link Fence
   F1665-08 ............... Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer Coated Steel Barbed Wire used with Chain Link Fence
Automated Vehicular Gate Construction

Industrial and Commercial Swing Gates

Strength and Protective Coatings on Metal

Industrial Chain-Link Fence Framework

Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.

C. Federal Specifications (Fed. Spec.):

FF-P-110J ............... Padlock, Changeable Combination

SPEC WRITER NOTE: Update Product requirements to agree with applicable requirements (Types, Grades, Class, Tables, etc) specified in the referred APPLICABLE PUBLICATIONS.

PART 2 – PRODUCTS

2.1 GENERAL

Materials shall conform to the above referenced publications for ferrous metals, zinc-coated; and detailed specifications forming the various parts thereto; and other requirements specified herein. Zinc-coat metal members (including fabric, gates, posts, rails, hardware and other ferrous metal items) after fabrication shall be reasonably free of excessive roughness, blisters and sal-ammoniac spots.

SPEC WRITER NOTE: In dry climates of Southwest States specify 340 g/m² (1.2 oz./sq. ft.) coating in Paragraph 2.2 Elsewhere specify 570 g/m² (2 oz./sq. ft.). Specify heavier coating or other material for use in salt-laden or corrosive industrial atmospheres.

2.2 CHAIN-LINK FABRIC

SPEC WRITER NOTE: Choose the appropriate type of fabric for the project and delete the remaining choices.

A. Steel Chain Link Fabric: // ___in. // mesh, // ___ // gauge // ___ // high, // top selvage //, // bottom selvage //.

1. Zinc-Coated Steel Fabric: hot dipped galvanized before or after weaving.
   a. Class 1 - 1.2 oz/ft² (366 g/m²)
   b. Class 2 - 2.0 oz/ft² (610 g/m²)

2. Aluminum-Coated Steel Fabric (Aluminized)
3. Polymer Coated Steel Fabric: the wire gauge specified for polymer-coated wire is that of the metallic coated steel core wire
   a. Class 1 extruded
   b. Class 2a extruded and adhered
   c. Class 2b fused and adhered
4. Fabric selvage: Standard fabric selvage for 2 in (50 mm) mesh 72 in. (1.8 m) high and over is knuckle finish at one end, twist at the other, K&T. Fabric less than 72 in (1.8 m), knuckle finish top and bottom.

2.3 STEEL FENCE FRAMEWORK

A. Round steel pipe and rail: Group IA Heavy Industrial Fence Framework, schedule 40 galvanized pipe. Exterior zinc coating Type A, interior zinc coating Type A. // Regular Grade //, // Intermediate Strength Grade //, // High Strength 83000 Grade //. Line post: // size //
   1. End, Corner, Pull post: // size //
   2. Brace rails, top, bottom, and intermediate rails, 1.660 in. (42.2 mm) OD, 2.27 lb/ft
3. [3.38 kg/m]

B. Polymer Coated Framework: Polymer coated framework shall have a // PVC/ // // Polyolefin // // Polyester // coating fused and adhered to the exterior zinc coating of the post or rail. PVC and polyolefin coatings shall have minimum thickness 10-mils (0.254 mm), polyester coating minimum thickness 3 mils (0.0076 mm. Color to match fabric // dark green // // olive green // // brown // // black //.

2.4 TENSION WIRE

A. Metallic Coated Steel Marcelled Tension Wire: 7 gauge (0.177 in.) (4.50 mm) marcelled wire
   1. Type I Aluminum-Coated (Aluminized) 0.40 oz/ft² (122 g/m²)
   2. Type II Zinc-Coated Class 4 - 1.2 oz/ft² (366 g/m²)
   3. Type II Zinc-Coated Class 5 - 2.0 oz/ft² (610 g/m²)
   4. Type III Zinc-5% Aluminum-Mischmetal Alloy Coated Steel Fabric Class 1 - 0.6 oz/ft² (183 g/m²) Class 2 - 1.0 oz/ft² (305 g/m²)

B. Polymer Coated Steel Tension Wire: 7 gauge (0.177 in.) (4.50 mm) wire.
   Wire gauge specified is the core wire gauge.
   1. Class 1, extruded
   2. Class 2a, extruded and adhered
   3. Class 2b, fused and adhered,
2.5 BARBED WIRE

A. Metallic Coated Steel Barbed Wire: Double 12-½ gauge (0.099 in.) (2.51 mm) twisted strand wire, with 4 point 14 gauge (0.080 in.) (2.03 mm) round barbs spaced 5 inches (127 mm) on center. // Insert material coating specification including type and class when applicable //
1. Coating Type A - Aluminum-Coated (Aluminized): Strand wire coating
   Type A - 0.30 oz/ft² (90 g/m²) with aluminum alloy barbs.
2. Coating Type Z - Zinc-coated: Strand wire coating Type Z, Class 3, 0.80 oz/ft² (254 g/m²), barb coating 0.70 oz/ft² (215 g/m²)

B. Polymer Coated Barbed Wire: 0.80 in (2.03 mm) double twisted strand wire; zinc coated four point, 14 gauge (0.080 in.) (2.03 mm) barbs spaced 5 inches (127 mm) on center // Insert strand wire Class coating and color //
1. Class 1, extruded
2. Class 2a, extruded and adhered
3. Class 2b fused and adhered

2.6 FITTINGS

A. Tension and Brace Bands: Galvanized pressed steel, minimum steel thickness of 12 gauge (0.105 in.) (2.67 mm), minimum width of 3/4 in. (19 mm) and minimum zinc coating of 1.20 oz/ft² (366 g/m²). Bands supplied with 5/16 in. (7.94 mm) or 3/8 in. (9.53 mm) galvanized steel carriage bolts.

B. Terminal Post Caps, Line Post Loop Tops, Rail and Brace Ends, Boulevard Clamps, Rail Sleeves: Pressed steel galvanized after fabrication having a minimum zinc coating of 1.20 oz/ft² (366 g/m²).

C. Truss Rod Assembly: 3/8 in. (9.53 mm) diameter steel truss rod with a pressed steel tightener, minimum zinc coating of 1.2 oz/ft² (366 g/m²), assembly capable of withstanding a tension of 2,000 lbs. (970 kg).

D. Tension Bars: Galvanized steel one-piece length 2 in. (50 mm) less than the fabric height. Minimum zinc coating 1.2 oz./ft² (366 g/m²).
1. Bars for 2 in. (50 mm) and 1 ¾ in. (44 mm) mesh shall have a minimum cross section of 3/16 in. (4.8 mm) by 3/4 in. (19 mm).
2. Bars for 1 in. (25 mm) mesh shall have a cross section of 1/4 in. (6.4 mm) by 3/8 in. (9.5 mm).
3. Bars for small mesh 3/8 in. (10 mm), 1/2 in. (13 mm) and 5/8 in. (16 mm) shall be attached (sandwiched) to the terminal post using a galvanized steel strap having a minimum cross section of 2 in. (51 mm) by 3/16 in. (4.8 mm) with holes spaced 15 in. (381 mm) on center.
to accommodate 5/16 in. (7.9 mm) carriage bolts which are to be thru bolted thru the strap the mesh and thru the terminal post.

E. Barbed Wire Arms: In compliance with ASTM F626, pressed steel galvanized after fabrication, minimum zinc coating of 1.20 oz./ft² (366 g/m²), capable of supporting a vertical 250 lb (113 kg) load. // Type I – three strand 45 degree (0.785 rad) arm // // Type II – three strand vertical arm // // Type III – V shaped six strand arm //.

F. Polymer Coated Color Fittings: Polymer coating minimum thickness 0.006 in. (0.152 mm) fused and adhered to zinc coated fittings and match color to fence system.

2.7 TIE WIRE AND HOG RINGS

Tie Wire and Hog Rings: Galvanized minimum zinc coating 1.20 oz/ft² (366 g/m²) 9 gauge (0.148) (3.76 mm) steel wire. Polymer coated; match the coating, class and color to that of the chain link fabric.

2.8 SWING GATES

A. Swing Gates: // single // // double // ___ opening ___ by ___ ft. high. Galvanized steel welded fabrication. Gate frame members 1.900 in. OD (48.3 mm) // Group IA F1083 schedule 40 pipe // // Group IC pipe // Frame members spaced no greater than 8 ft. (2440 mm) apart vertically and horizontally. Welded joints protected by applying zinc-rich paint. Positive locking gate latch fabricated of 5/16 in. (7.9 mm) thick by 1 ¾" (44.45 mm) pressed steel galvanized after fabrication. Galvanized malleable iron or heavy gauge pressed steel post and frame hinges. Match gate fabric to that of the fence system. Gateposts ___ OD, ___ lb/ft. Polymer coated gate frames and gateposts; match the coating type and color to that specified for the fence framework. Moveable parts such as hinges, latches and drop rods may be field coated using a liquid polymer touch up.

2.9 HORIZONTAL SLIDE GATES

A. Overhead Slide Gates: Gate framing to be of welded construction, minimum 1.900 in. OD (48.3 mm) pipe members. // Group IA ASTM F 1083 Schedule 40 pipe // // Group IC pipe //. Framing members to be spaced no more than 8 feet (2440 mm) apart horizontally and vertically. Welded joints are to be protected by applying zinc-rich paint in accordance with ASTM Practice A780. Positive locking latch, 5/16 in. (7.9 mm) thick by 1 ¾ in. (44.45 mm) pressed steel, galvanized after fabrication. Galvanized steel drop bars to be provided with double gates. Chain link fabric to match the fence system. Manufacturer’s
standard overhead beam/structure, track, rollers and accessories
designed to support the load of the gate panel taking into
consideration wind load and possible icing. The support beam/structure
to be galvanized or receive proper corrosion protection. Gateposts to be ___ OD _____ lb/ft.

1. Cantilever Slide Gates: In compliance with ASTM F1184 Type II
2. Class 1-External Roller Design: Horizontal top and bottom steel pipe
“track” members to be 2.375 in. OD (60.3 mm), vertical and internal members 1.900 in. O.D. in compliance with // Group IA 1083 Schedule 40 pipe // // Group IC pipe //. Gate frame to be fabricated by welding, vertical and horizontal members located no greater than 8 ft. (2440 mm) apart. The length of back frame support section shall be a minimum of 40% of the opening. Welded joints are to be protected by applying zinc-rich paint in accordance with ASTM Practice A780. Gates designed to open or close by applying an initial pull force no greater 40 lbs. (18.14 kg). Match chain link fabric to that of the fence system. Positive locking latch fabricated galvanized pressed steel. Galvanized steel drop bars provided with double gates. Gateposts, 4.000 in. OD (101.6 mm) ___ lb/ft // Group IA Schedule 40 pipe // // Group IC pipe //. Provide safety protective guards for the top and bottom external rollers.
Gate frame fabricated by welding, vertical and horizontal members located no greater than 8 ft. (2440 mm) apart. The length of back frame support section shall be a minimum of 40% of the opening. Class 2 cantilever slide gates to comply with the performance deflection criteria. Gates designed to open or close by applying an initial pull force no greater than 40 lbs. (18.14 kg). Internal truck assemblies designed to handle the forces required for gate size opening and height. Match chain link fabric to that of the fence system. Gateposts, 4.000 in. O.D. (106.1 mm) ___ lb/ft // Group IA schedule 40 pipe // // Group IC pipe //.
C. Polymer coated horizontal slide gates and posts shall match the coating type and color as that specified for the fence framework

2.10 CONCRETE

Concrete for post footings shall have a 28-day compressive strength of 3,000 psi (25.8 MPa).
PART 3 EXECUTION

3.1 CLEARING FENCE LINE

Clearing: Surveying, clearing, grubbing, grading and removal of debris for the fence line or any required clear areas adjacent to the fence. Surveying, clearing, grubbing, grading and removal of debris for the fence line or any required clear areas adjacent to the fence is included in the earthwork contractor’s contract. The contract drawings indicate the extent of the area to be cleared and grubbed.

3.2 FRAMEWORK INSTALLATION

A. Posts: Posts shall be set plumb in concrete footings. Minimum footing depth, 24 in. (609.6 mm). Minimum footing diameter four times the largest cross section of the post up to 4.00” (101.6mm) O.D. and three times the largest cross section of post greater than 4.00” (101.6mm). O.D. Gate posts require larger footings. Top of post concrete footing to be // at grade // // 6 inches (152 mm) below grade // and crowned to shed water away from the post. Line posts installed at intervals not exceeding 10 ft. (3.05 m) on center.

B. Top rail: When specified, install 21 ft. (6.4 m) lengths of rail continuous thru the line post or barb arm loop top. Splice rail using top rail sleeves minimum 6 in. (152 mm) long. The rail shall be secured to the terminal post by a brace band and rail end. Bottom rail or intermediate rail shall be field cut and secured to the line posts using boulevard bands or rail ends and brace bands. Fences 12 feet (3.66 m) high or higher require mid rail.

C. Terminal posts: End, corner, pull and gate posts shall be braced and trussed for fence 6 ft. (1.8 m) and higher and for fences 5 ft. (1.5 m) in height not having a top rail.

D. Tension wire: Shall be installed 4 in. (102 mm) up from the bottom of the fabric. Fences without top rail shall have a tension wire installed 4 in. (102 mm) down from the top of the fabric. Tension wire to be stretched taut, independently and prior to the fabric, between the terminal posts and secured to the terminal post using a brace band. Secure the tension wire to the chain link fabric with a 9 gauge hog rings 18 in. (457 mm) on center and to each line post with a tie wire. Install the top tension wire through the barb arm loop for fences having barbed wire and no top rail.
3.3 **CHAIN LINK FABRIC INSTALLATION**

A. Chain Link Fabric: Install fabric to // outside // // inside // of the framework. Attach fabric to the 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. (8 mm) carriage bolts spaced no greater than 12 inches (305 mm) on center. Small mesh fabric less than 1 in. (25 mm), attach to terminal post by sandwiching the mesh between the post and a vertical 2 in. wide (50 mm) by 3/16 in. (5 mm) steel bar using carriage bolts, thru bolted thru the bar, mesh and post spaced 15 in. (381 mm) on center. Chain link fabric to be stretched taut free of sag. Fabric to be secured to the line post with tie wires spaced no greater than 12 inches (305 mm) on center and to rail spaced no greater than 18 inches (457 mm) on center. Secure fabric to the tension wire with hog rings spaced no greater than 18 inches (457 mm) apart.

B. // Tie wire shall be wrapped around the post or rail and attached to the fabric wire picket on each side by twisting the tie wire around the fabric wire picket two full turns. // // Tie wire shall be wrapped 360 degrees (6.28 rad) around the post or rail and the two ends twisted together three full turns. // Excess wire shall be cut off and bent over to prevent injury. The installed fabric shall have a ground clearance on no more than 2 inches (50 mm).

3.4 **BARBED WIRE INSTALLATION**

Barbed Wire: Stretched taut between terminal posts and secured in the slots provided on the line post barb arms. Attach each strand of barbed wire to the terminal post using a brace band. Indicate type of barb arm, Type // I //, // II // or // III // and direction // inward // // outward // for installation of Type I arm.

3.5 **GATE INSTALLATION**

A. Swing Gates: Installation of swing gates and gateposts in compliance with ASTM F567. Direction of swing shall be // inward // // outward //. Gates shall be plumb in the closed position having a bottom clearance of 3 in. (76 mm) grade permitting. Hinge and latch offset opening space from the gate frame to the post shall be no greater than 3 in. (76 mm) in the closed position. Double gate drop bar receivers shall be set in a concrete footing minimum 6 in. (152 mm) diameter 24 in. (610 mm) deep. Gate leaf holdbacks shall be installed for all double gates. Electrically operated gates and accessories must be manufactured and installed in compliance with manufacturer’s recommendations.
B. Horizontal Slide Gates: Installation varies by design and manufacturer, install according to manufacturer’s instructions and in accordance with ASTM F567. Gates shall be plum in the closed position, installed to slide with an initial pull force no greater than 40 lbs. (18.14 kg). Double gate drop bar receivers to be installed in a concrete footing minimum 6 in. (152 mm) diameter, 24 in. (610 mm) deep. Ground clearance shall be 3 in. (76 mm), grade permitting. Electrically operated gates and accessories must be manufactured and installed in compliance with manufacturer’s recommendations.

3.6 NUTS AND BOLTS

Bolts: Carriage bolts used for fittings shall be installed with the head on the secure side of the fence. All bolts shall be peened over to prevent removal of the nut.

3.7 ELECTRICAL GROUNDING

Grounding: Grounding, when required, shall be specified and included in Contract Section 33 79 00. A licensed electrical contractor shall install grounding.

3.8 CLEAN UP

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 ---