

**SECTION 32 31 13
CHAIN LINK FENCES AND GATES**

SPEC WRITER NOTES:

1. 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.
2. 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 of fencing for enclosures of electrical equipment and for lightning protection as shown: Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.
- B. Temporary Construction Fence: Section 01 00 00, GENERAL REQUIREMENTS.
- C. Finish Grading: // Section 31 20 00, EARTH MOVING //, and Section 32 90 00, PLANTING //.
- D. Guard Booths: Section 13 34 19, METAL BUILDING SYSTEMS
- E. Card readers and biometric devices: Section 28 13 11, PHYSICAL ACCESS CONTROL SYSTEMS
- F. Intrusion alarm: Section 28 16 11, INTRUSION DETECTION SYSTEM
- G. 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
- A817-07.....Metal-Coated Steel Wire for Chain-Link Fence
Fabric and Marcellled Tension Wire
- C94/C94M-07.....Ready-Mixed Concrete
- F567-07.....Installation of Chain-Link Fence
- F626-(R2003).....Fence Fittings
- F900-05.....Industrial and Commercial Swing Gates
- F1043-06.....Strength and Protective Coatings on Metal
Industrial Chain-Link Fence Framework
- F1083-08.....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 ASTM F1083 and ASTM A392 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

ASTM A392 9 gauge wire woven in a 50 mm (2 inch) mesh. Top and bottom selvage shall have twisted and barbed finish. Zinc-coating weight shall be // 340 // 570 // grams/m² (// 1.2 // 2.0 // ounces per square foot).

2.3 POST, FOR GATES AND FENCING

ASTM F1083, Grade SK-40A, round, zinc-coated steel. Dimensions and weights of posts shall conform to the tables in the ASTM Specification. Provide post braces and truss rods for each gate, corner, pull or end post. Provide truss rods with turnbuckles or other equivalent provisions for adjustment.

SPEC WRITER NOTE: Omit Rails (top or bottom) not shown. See TECHNICAL NOTES at end of this section.

2.4 TOP RAIL AND BOTTOM RAIL

ASTM F1083, Grade SK-40A, round, zinc-coated steel. Dimensions and weights of posts shall conform to the tables in the ASTM Specification; fitted with suitable expansion sleeves and means for securing rail to each gate, corner, and end posts.

SPEC WRITER NOTE: Omit Tension Wire (top or bottom) not shown. See TECHNICAL NOTES at end of this section.

2.5 TOP AND BOTTOM TENSION WIRE

ASTM A817 and ASTM F626, zinc-coated, having minimum coating the same as the fence fabric.

2.6 ACCESSORIES

Accessories as necessary caps, rail and brace ends, wire ties or clips, braces and tension bands, tension bars, truss rods, and miscellaneous accessories conforming to ASTM F626

SPEC WRITER NOTE: Where barbed wire is not shown, omit Paragraphs 2.7 and 2.8. See TECHNICAL NOTES at end of this section.

2.7 BARBED WIRE SUPPORT ARMS

ASTM F626, single arm type, steel or malleable iron.

2.8 BARBED WIRE

ASTM A121, zinc-coated steel wire and barbs; standard size and construction: 2.51 mm (0.099 inch) diameter line wire with 2.03 cm (0.080 inch) diameter, 2-point barbs.

2.9 GATES

ASTM F900, type as shown. Gate framing, bracing, latches, and other hardware zinc-coating weight shall be the same as the FABRIC. // Gate leaves more than 2400 mm (8 feet) wide shall have either intermediate members and diagonal truss rods, or shall have tubular members as necessary to provide rigid construction, free from sag or twist. // Gates less than 2400 mm (8 feet) wide shall have truss rods or intermediate braces //. Attach gate fabric to the gate frame by method standard with the manufacturer, except that welding will not be permitted. Arrange latches for padlocking so that padlock will be accessible from both sides of the gate regardless of the latching arrangement. When required, extend each end member of gate frame sufficiently above the top member or provide three strands of barbed wire in horizontal alignment with barbed wire strands on the fence.

SPEC WRITER NOTE: For double gates, use subparagraph A.

2.10 GATE HARDWARE

A. Manufacturer's standard products, installed complete. The type of hinges shall allow gates to swing through 180 degrees, from closed to open position. Hang and secure gates in such a manner that, when locked, they cannot be lifted off hinges.

//B. Provide stops and keepers for all double gates. Latches shall have a plunger-bar arranged to engage the center stop. Arrange latches for locking. Center stops shall consist of a device arranged to be set in concrete and to engage a plunger bar. Keepers shall consist of a

mechanical device for securing the free end of the gate when in full open position. //

SPEC WRITER NOTE: If job specification does not have Section 08 71 00, DOOR HARDWARE, omit Subparagraph 2.10.C and substitute Subparagraph 2.10.D.

C. Padlocks for gates are specified under Section 08 71 00, DOOR HARDWARE. Padlocks shall have chains that are securely attached to the gate or gate post.

//D. Equip gate openings with padlock conforming to Fed Spec FF-P-110H, Type EPC, size 50 mm (2 inch). Padlocks shall have chains that are securely attached to the gate or gate post. Before padlocks are delivered to project, submit sample to Resident Engineer for approval. Approved sample may be incorporated in work. Key padlock as directed by the Resident Engineer. //

2.11 CONCRETE

ASTM C94/C94M, using 19 mm (3/4 inch) maximum-size aggregate, and having minimum compressive strength of 25 mPa (3000 psig) at 28 days. Non-shrinking grout shall consist of one part Portland cement to three parts clean, well-graded sand, non-shrinking grout additive and the minimum amount of water to produce a workable mix.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fence by properly trained crew, on previously prepared surfaces, to line and grade as shown. Install fence in accordance with ASTM F567 and with the manufacturer's printed installation instructions, except as modified herein or as shown. Maintain all equipment, tools, and machinery while on the project in sufficient quantities and capacities for proper installation of posts, chain links and accessories.

SPEC WRITER NOTE: Use Subparagraph A for Property Line Fencing or similar purpose requiring accurate fence alignment.

B. A Registered Professional Land Surveyor or Registered Civil Engineer specified in Section 01 00 00, GENERAL REQUIREMENTS, shall stake out and certify the fence alignment to meet the requirements as shown.

SPEC WRITER NOTE: Use Paragraph 3.2 and 3.3 for fencing set in individual concrete footings. Use Paragraph 3.5 for

fencing set in concrete slabs, walls, curbs, or similar structure.

3.2 EXCAVATION

Excavation for concrete-embedded items shall be of the dimensions shown, except in bedrock. If bedrock is encountered before reaching the required depth, continue the excavation to the depth shown or 450 mm (18 inches) into the bedrock, whichever is less, and provide a minimum of 50 mm (2 inches) larger diameter than the outside diameter of the post. Clear loose material from post holes. Grade area around finished concrete footings as shown and dispose of excess earth as directed by the Resident Engineer.

3.3 POST SETTING

Install posts plumb and in alignment. Set post in concrete footings of dimensions as shown, except in bedrock. Thoroughly compact concrete so as it to be free of voids and finished in a slope or dome to divert water running down the post away from the footing. // Straight runs between braced posts shall not exceed 150 m (500 feet) //. Install posts in bedrock with a minimum of 25 mm (one inch) of non-shrinking grout around each post. Thoroughly work non-shrinking grout into the hole so as to be free of voids and finished in a slope or dome. Cure concrete and grout a minimum of 72 hours before any further work is done on the posts.

SPEC WRITER NOTE:

1. Do not use following paragraph for perimeter and other fencing. See TECHNICAL NOTES at end of this section.

3.4 POST SETTING IN STRUCTURES

Install post in retaining walls, curbs, concrete slabs, or similar construction in proper size galvanized pipe sleeves set into the concrete or built into the masonry as shown. Set sleeves plumb and 13 mm (1/2 inch) above the finished structure. Fill space solidly between sleeve and post with non-shrinking grout, molten lead, or sulphur, and finish to divert water running down the post away from the post base.

3.5 POST CAPS

Fit all exposed ends of post with caps. Provide caps that fit snugly and are weathertight. Where top rail is used, provide caps to accommodate the top rail. Install post caps as recommended by the manufacturer and as shown.

3.6 SUPPORTING ARMS

Design supporting arms, when required, to be weathertight. Where top rail is used, provide arms to accommodate the top rail. Install supporting arms as recommended by the manufacturer and as shown.

3.7 // TOP RAILS // AND BOTTOM RAILS //

Install rails before installing chain link fabric. Provide suitable means for securing rail ends to terminal and intermediate post. // Top rails shall pass through intermediate post supporting arms or caps as shown. // The rails shall have expansion couplings (rail sleeves) spaced as recommended by the manufacturer. Where fence is located on top of a wall, install expansion couplings over expansion joints in wall.

3.8 // TOP // AND BOTTOM // TENSION WIRE

Install and pull taut tension wire before installing the chain-link fabric.

3.9 ACCESSORIES

Supply accessories (posts braces, tension bands, tension bars, truss rods, and miscellaneous accessories), as required and recommended by the manufacturer, to accommodate the installation of a complete fence, with fabric that is taut and attached properly to posts, rails, and tension wire.

3.10 FABRIC

Pull fabric taut and secured with wire ties or clips to the // top rail // bottom rail // and tension wire // close to both sides of each post and at intervals of not more than 600 mm (24 inches) on centers. Secure fabric to posts using stretcher bars and ties or clips.

3.11 BARBED WIRE

Install barbed wire, when required, on supporting arms above the fence posts. Extend each end member of gate frames sufficiently above the top member to carry three strands of barbed wire in horizontal alignment with barbed wire strands on the fence. Pull each strand taut and securely fasten to each supporting arm and extended member.

3.12 GATES

Install gates plumb, level, and secure for full opening without interference. Set keepers, stops and other accessories into concrete as required by the manufacturer and as shown. Adjust hardware for smooth operation and lubricate where necessary.

3.13 REPAIR OF GALVANIZED SURFACES

Use galvanized repair compound, stick form, or other method, where galvanized surfaces need field or shop repair. Repair surfaces in accordance with the manufacturer's printed directions.

3.14 FINAL CLEAN-UP

Remove all debris, rubbish and excess material from the station.

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