

LAUSD

SECTION 02821

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.01 SUMMARY

- A. Provisions of Division 01 apply to this section
- B. Section Includes:
 - 1. Chain link fences and gates as indicated.
- C. Related Sections:
 - 1. Section 02310: Grading
 - 2. Section 02316: Excavating, Backfilling, and Compacting for Pavement.
 - 3. Section 02765: Pavement Repair.
 - 4. Section 02770: Site Concrete Work.

1.02 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit plans and details indicating extent of fences, locations of gates, and details of attachment and footings. Indicate means and methods for surface preparation and finishing.

1.03 QUALITY ASSURANCE

- A. Comply with Standard Specifications for Public Works Construction, current edition.

1.04 GATE IDENTIFICATION

- A. Gates in path of travel must comply with exit door requirements, (CBC Section 1133B.1.1.1.4/ ADAAG 4.13.3).
- B. Hardware shall not require pinching, grasping, or twisting motion to operate.
- C. The maximum effort to operate gates shall not exceed 5 lbs (22.2 N)
- D. Provide solid kick plates 10 inch minimum height, 3 inch maximum from the paving surface, both sides of the gate, or, provide a sign on the adjacent gate stating that "This gate is to remain locked in the open position during business/school hours or during any public functions." The sign shall be mounted at 60" above grade on/or adjacent to the gate.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Concrete: **Class 500-C-2500** concrete furnished as prescribed in Section 201-1 "Concrete, Mortar and Related Materials" of the Standard Specifications for Public Works Construction or may be provided in the following volumetric proportions:

Portland Cement	1 part
Fine Aggregate	2 parts
Coarse Aggregate (1/4 inch to 1-1/2 inches)	4 parts
Water	7-1/2 gallons, maximum per sack of cement

- B. Chain Link Fence Fabric: Conforming to ASTM A 392, Class C2 zinc coating, 2.00 ounces minimum per square foot of uncoated wire surface, hot-dipped galvanized after weaving, and top and bottom edges knuckled.
- Fabric for perimeter fencing and interior fencing shall be 9 gauge woven wire with 2 inch mesh, unless otherwise specified.
 - For perimeter fences 16 feet high, the upper 8 feet of fabric may be 11 gauge..
 - Fences 12 feet high or less shall be furnished with single width fabric.
 - Fabric for fencing on top of handball court shall be 9 gauge wire minimum with 1 inch mesh.
 - Fabric for fencing of tennis courts shall be full height, single width, 9 gauge x 1-3/4 inches mesh chain link fabric.
 - Installed fence fabric shall be free from barbs, icicles, or other projections and installed fence fabric with such defects will be deemed defective Work.
- C. Posts, Top Rails, Brace Rails and Gate Frames: Standard weight, galvanized, welded or seamless steel pipe conforming to ASTM A 53, with a minimum yield strength of 35,000 psi. Embed posts into footing 6 inches less than the depth of the footing unless noted otherwise on drawings.
- D. Schedule of Posts and Footings:

Item	Height	Nominal Pipe Size (inches)	Outside Diameter (inches)	Weight (pounds per foot)	Footings*	
					Diameter (inches)	Depth (inches)
Top Rail, Brace Rails and Transom Rails	Up to 10'-0"	1-1/4	1.660	2.27	N/A	N/A
	10'-1" to 16'-0"	1-1/2	1.900	2.72	N/A	N/A
Line Posts	Up to 6'-0"	2	2.375	2.65	12	24
	6'-1" to 8'-0"	2	2.375	2.65	12	36
	8'-1" to 10'-0"	2-1/2	2.875	5.79	12	36
	10'-1" to 16'-0"	3	3.5	7.58	14	60
Terminal, Corner, Angle & Pull Posts	Up to 8'-0"	2-1/2	2.875	5.79	12	36
	8'-0" to 10'-0"	2-1/2	2.875	5.79	14	42
	10'-1" to 16'-0"	3	3.5	7.58	14	60
Pedestrian Gate Posts	Up to 8'-0"	2-1/2	2.875	5.79	14	36
Gate Frames	Up to 8'-0"	1-1/2	1.900	2.72	N/A	N/A
Driveway Double-Leaf Swing Gate Posts: Opening						
	Up to 17'-3-1/2"	3 1/2	4	9.11	16	42
	17'-4" to 20'-3-1/2"	3-1/2	4	9.11	16	42

- E. **Post Caps:** Malleable iron, ASTM A 47, Grade 32510, designed to fit snugly over posts with a minimum projection of 1-1/2 inches below top of posts. Post caps shall be manufactured with a curved top.
- F. **Eye Tops:** Malleable iron, ASTM A 47, Grade 32510, designed to fit over line posts, and for through passage of top rail.
- G. **Expansion Sleeve Couplings for Top Rails:** Steel, 6 inches long, designed to fit tightly on inside of rail, fitted with raised center.
- H. **Rail Ends for Top Rails and Brace Rails:** Malleable iron, ASTM A 47, Grade 32510, with holes to receive 3/8 inch bolts for securing to rail end bands.
- I. **Tension Bands** and Bands for Securing Rail Ends: Mild steel flats, at least 11 gage x one inch, tension bands in gates shall be 11 gage x 1 inch. Bolts for use with tension bands and rail end bands shall be 3/8 inch x 1-1/2 inches.
- J. **Tension Bars:** Mild steel flats at least 3/16 inch x 3/4 inch.
- K. **Tension Wire** for Installation at Bottom of Fabric: 6 gauge steel spring wire, conforming to requirements of AISI Steel Products Manual, Carbon Steel Wire, Section 16, merchant quality, galvanized, soft temper with Type I coating. Wavy type wire is not acceptable.
- L. **Turnbuckles** for installation with Tension Wires: Eye and hook type, drop forged steel, right and left hand threads, at least 3/8 inch screw diameter with at least 4-1/2 inches of take-up.
- M. **Tie Wire:** Aluminum ties 6 gauge for fastening fabric to posts, top rails and brace rails. At bottom tension wire 9 gauge galvanized hog rings shall be installed.
- N. **Finish of Metal Parts:** Post caps, couplings, rail ends, tension bands, tension bars, turnbuckles, rivets, bolts, and other metal parts and fittings shall be hot-dipped galvanized after fabrication, except bolts, which may be galvanized or cadmium-plated. Galvanizing shall conform to ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products, and ASTM A 47 Standard Specification for Ferritic Malleable Iron Castings.
- O. **Paints for Refurbishing Existing Fence Posts, Rails, and Accessories:** As required to provide the galvanized color of a new installation.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install fences to heights indicated on Drawings.
- B. Space fence posts at equal intervals between terminal, angle, corner, and gate posts, and not more than 10 feet apart measured from center to center of posts. In curved fence sections having a radius of 50 feet or less, space posts not more than 5 feet - 6 inches apart. Install posts so that top of eye of post caps are level with top of fabric.
- C. Install angle or corner posts at each change in direction of 15 degrees or more, at change of 5 percent or more in grade of fencing, and at the beginning and end of curved fence sections.

- D. Install terminal posts at ends of runs of fencing. Install gateposts on both sides of driveway and pedestrian gates. For double-leaf gates, net opening between gate posts shall be gate size as indicated on Drawings, plus 3-1/2 inches; for single leaf gates, net opening shall be gate size plus 2-1/2 inches.
- E. Where a fence is to be installed on a curb, construct footings with top of footing level with the lower finish grade. Align posts, set plumb and true before placing footings. Remove splattered concrete from exposed pipe surfaces while concrete is still soft. In bituminous surfaced areas, install seal coat on top of concrete footings.
- F. Install fences with top rail. Top rail shall pass through eye tops and be secured at ends with rail-end fittings and bands.
- G. Install fences over 10 feet in height, in addition to top rail, with a full length horizontal mid-rail set at mid-height of fence and rigidly secured to posts with rail end fittings and bands.
- H. In fences higher than 10 feet, install brace rails at angles, corners, and terminals at 1/4 and 3/4 of fence height. Provide one horizontal brace rail in panels adjacent to terminal, angle, corner, and gateposts, install at mid-height of fence and rigidly secured to posts with rail end fittings and bands. Provide horizontal brace rails, as specified, in panels of curved sections having a radius of 50 feet or less. Brace rails are not required in fencing 4 feet or less in height.
- I. Provide a transom rail and fabric at top of pedestrian gate openings. Install transom rail 6 feet - 8 inches above high point of grade at gate opening. Ends of transom rails shall be pinned or riveted to rail end fittings with 1/4-inch mild steel rivets. Pin or rivet must go through rail and peen. Welding on rail ends is not permitted.
- J. Install bottom tension wire a minimum of 3 inches from grade for fencing, and provide a turnbuckle for each 150 feet of wire or fractional part thereof. Turnbuckles are not required in runs of 15 feet or less. Install ends of tension wires to posts in a manner to prevent slipping or loss of tension. Wrap should start from fence side of post. Turn end of wire around post tightly twisted at least 3 times around wire. At turnbuckles, wire through eye and tightly twist end at least 3 times around wire. Cut tail of bottom wire flush.
- K. Install fence fabric on outward facing side of posts, except for tennis courts. Install fence fabric with top edge projecting above top rail of fence.
- L. Install bottom of fence fabric to clear finish grades, except on bituminous surface install 3/4 inch above such surface. Locally shape and trench ground surfaces where necessary to provide uniform top and bottom alignment of fence.
- M. Tightly stretch fabric and at terminal, pull corner, angle, and gateposts, secure with tension bars extending full height of fence. Secure tension bars to posts with bolted tension bands spaced not more than 14 inches apart.

N. Bands and Ties: Install bands and ties in accordance with following schedule:

15 bands on 16 feet fence	16 ties on 16 feet fence	
11 bands on 12 feet fence	12 ties on 12 feet fence	
7 bands on 8 feet fence	7 ties on 8 feet fence	16" O.C.
6 bands on 6 feet fence	6 ties on 6 feet fence	18" O.C.
4 bands on 4 feet fence	4 ties on 4 feet fence	

O. Fasten fabric to line posts with wire ties spaced not more than 16 inches apart. Where 6 gauge aluminum ties are furnished, hook the tie at both ends. Installation of hooked ties with links is not permitted.

P. Fasten fabric to top rails, mid-rails, brace rails, with wire ties spaced not more than 18 inches apart. Bend back ends of tie wires so as not to be a hazard. At bottom tension wire, install hog rings spaced not more than 18 inches apart. Where 2 fabrics are furnished, lap the fabrics one mesh at mid-rail and tie both fabrics with 9 gauge wire or 6 gauge aluminum ties to midrails.

Q. Grind all field welds smooth, clean off flux and spatter, damaged galvanizing removed, burrs and projections ground off, properly prepared, then heavily coated with "Rust Bullet" as manufactured by Poliflex USA or equal product approved by Owner's Office of Environmental Health and Safety. Install coating in accordance with written recommendations of manufacturer.

R. Fabrication of Gates:

1. Frames: Fabricate gate frames from steel pipe of size specified, with joints at corners miter cut and continuously welded to sides.
2. Fabric: Install fence fabric to side members with tension bars and tension bands as specified, spaced not more than 14 inches apart. Tension bars shall extend full height of gate. Install fence fabric to top and bottom members and to brace rail with wire ties as specified for top rails, spaced not more than 12 inches apart.
3. Latches: Gate latches and the Owner will furnish strikes. Weld gate latches and strikes to gate posts and frames. Welding shall be performed before gate frames are galvanized, or welds shall be finished as specified for field welds.
4. Hinges: Install and adjust hinges; burr or center punch threads of gate hinge bolts to prevent removal of nuts. Install 3 hinges on each post for swing gates more than 16 feet wide. The Owner will provide hinges.
5. Grind welds flush and smooth. Hot-dip galvanize fabricated parts after welding, or finish weld as specified for field welds.

3.04 INSTALLATION ON TOP OF CONCRETE WALLS

A. Posts for fences on top of new concrete or concrete masonry walls shall be installed in 24 gauge galvanized iron inserts one inch larger than the outside post diameter. Wall thickness for such installation shall be 8 inches minimum. Depth of embedment of post shall not be less than 15 inches for fence height not exceeding 4 feet. Install post plumb, true, and fill joint space with cement grout or "Por-Rok," manufactured by Hallemite

Manufacturing Co., or equal, finished flush with top of wall. Remove excess grout and clean posts.

- B. Fencing on Gravity Walls: Post of fence not exceeding 8 feet high shall have a minimum of 15 inches embedment in gravity walls with a top width of 10 inches minimum and side of 1H: 4V. Where the height of gravity wall from top to bottom, within 5' from each side of a post, is less than 22 inches, provide concrete fence post footings and embed posts in accordance with the schedule of posts and footings as set forth in this section.
- C. Do not install footings on existing walls without the review of the Architect and DSA.

3.06 FENCING ADJUSTMENTS

- A. Where the finish grades are raised 6 inches or less, cut and re-knuckle the existing fence fabric. Adjust tension wire and tie to fabric. Bottom of fence fabric shall be installed ¼" above finish grade.
- B. Where the finish pavement is lowered 6 inches or less, demolishes the fence footing flush with the finish grade and adjust the fabric and its attachments. Bottom of fence fabric shall be installed ¼" above finish grade.
- C. Post footings and fabrics that require readjustment after installation shall be entirely replaced.

3.07 INSTALLATION OF GATES

- A. Provide gates of the sizes indicated on Drawings. Allow clearance on gates of 1-1/2 inches at bottom and one inch at top. Construct gates installed in sloping areas to conform to the grade. Provide an opening in each gate for access to locking device or padlock. Knuckle ends of fabric cut for opening to eliminate hazards.
- B. Sliding Gates and Swing Barricade Gates: Fabricate and install as indicated on Drawings. Wheel housing must be designed to fit tightly to roll track and prevent gate from rolling over objects. Unsupported cantilever type roll gates are not acceptable. Install gate stops in accordance with the drawings. Both top and track stops are required.

3.08 COMPLETION

- A. Completed fencing shall form continuous units between points indicated with required parts, accessories, and fittings provided and installed. Clean exposed metal surfaces of cement, grout and other foreign substances.
- B. Fill in holes left by removal of existing fence footings, except in areas where grading Work is indicated or specified, to existing grade with clean earth thoroughly compacted to at least same density as adjoining soil.

3.09 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.10 CLEANUP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION