

SECTION 32 31 13 (Formerly CSI SECTION 02821)

CHAIN-LINK FENCES AND GATES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Fence framework, fabric and accessories.
- B. Gates and related hardware.
- C. Installation

1.02 SCOPE OF WORK

- A. *Summary:* This section covers the work necessary to complete the chain link fence and gate installation.
- B. *General:* Like items of materials provided hereafter shall be the end products of one manufacturer in order to achieve standardization of appearance, maintenance and replacement except as noted. ***Major components including but not limited to Fence Framework and Chain-link Fabric shall be manufactured in the U.S.A.***
- C. *Delivery, Storage, and Handling:* Deliver material to the site in an undamaged condition. Carefully store material off the ground to provide proper protection against oxidation caused by ground moisture.

1.03 SUBMITTALS, CERTIFICATION, GUARANTEE AND INSPECTION

- A. Shop Drawings: Include complete details of fence and gate construction, fence height, post spacing, dimensions, unit weights of framework and concrete footing details.
- B. Product Data: Provide manufacturer's catalog cuts with printed specifications. Manufacturer shall provide certification of compliance with material specifications. Actual samples of the material maybe requested.
- C. Guarantee----- **To be filled in by owners' representative.**
- D. Inspection----- **To be filled in by owners' representative.**

PART 2- PRODUCTS

2.01 MATERIAL

A. Acceptable Manufacturers for Framework:

1. ASTM F 1043

Group IC:

Allied Tube & Conduit

16100 South Lathrop Avenue

Harvey, Illinois 60426

800-643-1523

2. ASTM F 1043

Group IA:

Any manufacturer of domestic material is acceptable

B. Framework:

1. High strength steel pipe, triple coated per Standard Specifications ASTM F 1043 Group IC (SS 40TM and SS 40TM XS as manufactured by Allied Tube and Conduit or approved equal); external coating per F 1043 Type B; internal coating per F 1043 Type D or steel pipe conforming to Standard Specification ASTM F 1043 Group IA (Schedule 40); external coating per F 1043 Type A; internal coating Type A.
2. All coating to be applied after welding. PVC coated material to be per ASTM F1043, 7.3, 8.1.3 and 8.1.4.1.
3. Pipe shall be straight, true to section and conform t the following weights:

Pipe Size OD	Group IA Lbs./Ft.	Group IC Lbs./Ft.
1-5/8"	2.27	1.84
1-7/8"	2.72	2.28
2-3/8"	3.65	3.12
2-7/8"	5.79	4.64
3-1/2"	7.58	5.71
4"	9.11	6.56
4-1/2"	10.79	10.07
5"		9.27
6-5/8"	18.97	
8-5/8"	24.7	

C. Fabric:

1. Aluminized fabric shall be manufactured in accordance with ASTM A 491 and coated before weaving with a minimum of 0.4 ounces of aluminum per square foot of surface area. The steel wire and coating shall conform to ASTM A817. Fabric to be 9 gauge woven in a 2" diamond mesh. Top and bottom selvage to be knuckled unless otherwise specified.

Or

2. Zinc-coated fabric shall be galvanized after weaving with a minimum 1.2 ounces of zinc per square foot of surface area and conform to ASTM A 392, Class 1. Fabric to be 9-gauge wire woven in a 2" diamond mesh. Top selvage and bottom selvage to be knuckled unless otherwise specified.
 - a. Lower 6' of back stop to be 2" mesh 6 ga fabric
 - b. Back stop overhangs to be 2" mesh 11 ga fabric
 - c. Tennis Court to have 1-3/4" mesh 11 ga fabric
 - d. Vinyl coated chain link to be per ASTM F 668. Color to be provided by specifying agency and to be per ASTM F 934. Finish gauges to have core wires as specified above.

2.02 CONCRETE MIX

A. Concrete conforming to ASTM C 94, having a minimum compressive strength of 3,000 PSI at 28 days.

2.03 COMPONENTS

A. Fence posts:

Fabric	Line Post	Terminal Post
<u>Height</u>	<u>O.D</u>	<u>O.D</u>
Under 6'	1-7/8"	2-3/8"
6' to 9'	2-3/8"	2-7/8"
9' to 12'	2-7/8"	4"

* Over 12' high see details on drawings.

B. Swing Gate Posts:

<u>Width</u>	<u>Width</u>	<u>Post O.D</u>
Single Gate	Double Gate	
Up to 6'	Up to 12'	2-7/8"
7' to 12'	14' to 24'	4"
13' to 16-1/2'	26' to 33'	4-1/2" Group IC
17' to 18'	34' to 36'	6-5/8" Group IA
Over 18'	Over 36'	8-5/8" Group IA

C. Rails and Braces: 1-5/8" O.D. Group IA or IV

D. Gates: Per ASTM F 900 with frame assembly of 1-7/8" O.D. Pipe Group IA or IV with welded joints. Weld areas repaired with zinc-rich coating applied per manufacturer's direction. Fabric to match fence. Gate accessories, hinges, latches, center stops, keepers and necessary hardware of quality required for industrial and commercial application. Latches shall permit padlocking. Vinyl coated system to have pressed steel corner fittings securely riveted to the frame.

E. Fittings:

All fittings to conform to ASTM F 626

Post Caps- Pressed steel, cast iron or cast aluminum alloy designed to fit snugly over posts to exclude moisture. Supply dome style caps for terminal posts and loop type for line post.

Rail and Brace Ends- Pressed steel, cast iron or cast aluminum alloy, cup- shaped to receive rail and brace ends.

Top Rail Sleeves- Tubular steel, 0.051 thickness x 6" long, expansion type.

Tension Bars- Steel strip, 3/4" wide x 3/16" thick.

Tension Bands- Pressed steel, 14 gauge thickness x 3/4" wide.

Brace Bands- Pressed steel, 12 gauge thickness x 3/4" wide.

Truss Rods- Steel rod, 5/16" diameter merchant quality with turnbuckle (take up).

Barbed Wire Arms- Pressed steel, cast iron or cast aluminum alloy fitted with clips or slots for attaching three strands of barbed wire. Arms shall be set outward on a 45-degree angle and be capable of supporting a 250- pound load at outer barbed wire connecting point without causing permanent deflection.

* Note: Caps and rail ends to be of the type that will not permit access by insects or shall be filled to the depth of 6" with urethane foam.

- F. *Tension Wire*: Marcellled 7 gauge steel wire, galvanized or aluminized per ASTM A 817 and A 824 or vinyl coated per ASTM F 1664, coated to match color of fabric, having a breaking strength per ASTM A 817.
- G. *Tie Wires*: As per ASTM F 626 Aluminum, 9 gauge, alloy 1100-H4 or equal. Lower 6' of back stops to have 6 gauge aluminum or 9 gauge zinc coated steel per ASTM F626.
- H. *Hog Rings*: Steel wire, 12 gauge, with a minimum zinc coating of 0.80 ounces per square foot of wire surface or 9 gauge aluminum per ASTM F 626.
- I. *Barbed Wire*: If required, commercial quality steel, 12-1/2 gauge, two strand twisted line wire with 4 point barbs at 5 inch spacing. Coating shall consist of a minimum of 0.80 ounces of zinc per square foot of wire surface conforming to ASTM A 121 or a minimum of 0.30 ounces of aluminum per square foot of wire surface conforming to ASTM A 585. Strand wires to be PVC coated per ASTM F 1665 and to match color of chain link fabric.

PART 3- EXECUTION

3.01 INSTALLATION

A. *General*: Installation to conform to ASTM F567.

*Do not construct fence until site grading is complete.

B. *Height*: Provide height as indicated on contract drawings.

C. *Post Spacing*: Space line posts at intervals not exceeding ten feet or as shown on plans.

D. *Post Settings*: Set terminal, gate and line posts plumb in concrete footing. Top of footing to be 2" above grade and sloped to direct water away from posts. The bottom of the footings are to be larger than top to aid in prevention of frost heaving. Tennis court footings to be held below the asphalt finish surface or as indicated on the plans. Concrete footing formula is as follows: Per ASTM F567

Diameter to be a minimum of 4 times the cross section of the post.

Depth to be a minimum of 36"

Fences taller than 12' add 3" of depth for each additional foot of height, or as shown on the plans.

E. *Bracing*: Brace gate and terminal posts back to adjacent line posts with 1-5/8" O.D. horizontal brace rails and 5/16" O.D. galvanized, diagonal, adjustable truss rods. Not required on fences having intermediate rails.

F. *Top Rail*: Install through line loop caps connecting sections with sleeves to form a continuous rail between terminal posts. No section to be longer than 21'.

G. *Bottom and Mid Rails*: If required shall be secured to each line post with a line-rail clamp, two way brace band or 2 each brace bands with rail ends.

H. *Bottom Tension Wire*: If required stretch between terminal posts 6" above grade and fasten to outside of line posts with wire ties.

I. *Fabric*: Pull fabric taut with bottom selvage 2" above grade except on backstops and tennis courts. Backstops and tennis courts to have fabric on finished grade. Fasten to terminal posts with tension bars threaded through mesh and secured with tension bands at maximum 15" intervals. Tie to line posts and top rails with tie wires spaced at maximum 12" on posts and 24" on rails. Attach to bottom tension wire with hog rings at maximum 24" intervals.

- J. *Barbed Wire*: If required anchor to terminal extension arms, pull taut, and firmly install in slots of line post extension arms. Barbed ratchets or brace bands to be used on end posts.
- K. *Gates*: Install gates plumb, level and secure for full opening with out interference. Anchor center stops and hold open keepers in concrete. Gates to be capable of 90 degree swing except if noted on plans for 180 degree swing.
- L. *Fasteners*: Install nuts for fittings, bands, and hardware bolts on inside of fence.
- M. *Backstop Overhangs*: Manufactured and installed as shown on plans.

3.02 **COMPLETION**

- A. The area of installation shall be left free of debris caused by the installation of the fence and be ready for use as soon as deemed acceptable by the Landscape Architect and Owner.

End of Section

Note: If wind screen or signs etc are to be used consult framework manufacturer for the wind load data.

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07/03/08

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