

SECTION 323113 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Vinyl coated Galvanized-steel chain link fabric.
 - 2. Vinyl coated Galvanized-steel framework.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 31 Section "Earth Moving" for filling and grading work.
 - 2. Division 03 Section "Cast-in-Place Concrete" for concrete for post footings.

1.3 SUBMITTALS

- A. General: Submit all fence components according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data in the form of manufacturer's technical data, specifications, and installation instructions for fence and gate posts, fabric, gates, gate operators, and accessories.
- C. Shop drawings showing location of fence, gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has at least three years' experience and has completed at least five chain link fence projects with same material and of similar scope to that indicated for this Project with a successful construction record of in-service performance.
- B. Single-Source Responsibility: Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for fences and gates shown on the Drawings in relation to the property survey and existing structures. Verify dimensions by field measurements.

1.6 MISCELLANEOUS REQUIREMENTS

- A. Deliver, store, uncrate, handle and install in manner to prevent damage to equipment.
- B. Remove promptly from site all debris resulting from installation of materials and equipment specified herein.
- C. Finish of all materials and equipment shall be appropriate for exterior locations.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Dimensions shown for pipe, roll-formed, and H-sections are outside dimensions.
- B. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
 - 1. Allied Tube and Conduit Corp.
 - 2. Anchor Fence, Inc.
 - 3. Wheatland Tube Company.
 - 4. Davis Walker Corp.
 - 5. Dominion Fence and Wire Prod.
 - 6. United States Steel

2.2 FABRIC - FENCING

- A. Selvage: Knuckled at both selvages.
- B. Steel Chain-Link Fence Fabric: Fabricated in one-piece widths for fencing 12 feet and less in height to comply with Chain Link Fence Manufacturers Institute (CLFMI) "Product Manual" and with requirements indicated below:
 - 1. Mesh and Wire Size:
 - a. Standard Fence - 2-inch mesh, 0.148-inch diameter (9 gauge).
- C. All fence shall be PVC coated as follows:
 - 1. PVC Coating Color: As selected by Architect from manufacturers' standard colors complying with ASTM F 934.
 - 2. Coating: ASTM F 688, Class 2B, PVC.

2.3 FRAMING

- A. Round member sizes are given in actual outside diameter (OD) to the nearest thousandth of inches. Round fence posts and rails are often referred to in ASTM standard specifications by nominal pipe sizes (NPS) or the equivalent trade sizes in inches. The following indicates these equivalents all measured in inches:

<u>Actual OD</u>	<u>NPS Size</u>	<u>Trade Size</u>
1.315	1	1-3/8
1.660	1-1/4	1-5/8
1.900	1-1/2	2
2.375	2	2-1/2
2.875	2-1/2	3
3.500	3	3-1/2
4.000	3-1/2	4
6.625	6	6-5/8
8.625	8	8-5/8

- B. Type I Round Posts: Standard weight (schedule 40) galvanized-steel pipe conforming to ASTM F 1083, according to heavy industrial requirements of ASTM F 669, Group IA,. Minimum yield strength of 30,000 psi or 83,000 psi, if indicated in specification or on drawing, not less than 1.8 oz. of zinc per sq. ft. Type A coating inside and outside according to ASTM F 1234, as determined by ASTM A 90, and weights per foot as follows:

<u>Actual OD</u>	<u>Weight (lb/ft)</u>	<u>NPS Size</u>
1.315	1.68	1
1.660	2.27	1-1/4
1.900	2.72	1-1/2
2.375	3.65	2
2.875	5.79	2-1/2
3.500	7.58	3
4.000	9.11	3-1/2
6.625	8.97	6
8.625	28.55	8

- C. Top Rail: Manufacturer's longest lengths (17 to 21 feet) with swaged-end or expansion-type coupling, approximately 6 inches long for joining. Provide rail ends or other means for attaching top rail securely to each gate corner, pull, and end post.

1. Round Steel: 1.660-inch OD Type I or II steel pipe.

- D. Framing

1. Steel posts for fabric heights greater than 6 feet and less than or equal to 8 feet:

- a. Round Line or Intermediate Posts: 2.375-inch OD Type I or II steel pipe, spaced every 8 feet.
- b. Round End, Corner, and Pull Posts: 3.000-inch OD Type I or II steel pipe.
- c. Top Rail: Manufacturer's longest lengths, with expansion type couplings, approximately 60 long, for each joint. Provide means for attaching top rail securely to each gate, corner, pull and end post.

- 1) 1.660 OD pipe, 2.27 lbs. per ft.

- d. Provide center brace rail for 8 foot fence.

- 1) 1.660 OD pipe, 2.27 lbs. per ft.

- e. Polymer Coated Color: Pipe: Polymer coated pipe shall have a PVC coating fused and adhered to the exterior zinc coating of the specified galvanized pipe. The coating shall have a minimum thickness 10-mils (0.254 mm) in accordance with the provisions listed in ASTM F 1043. Color shall be as selected by Architect from manufacturers' standard colors complying with ASTM F934.
2. Steel posts for fabric heights 10 feet:
- a. Round Line or Intermediate Posts: 2.875-inch OD, Type I or II steel pipe.
 - b. Round End, Corner, and Pull Posts: 3.000-inch OD High strength, 83K, Type I or II steel pipe.
 - c. Top Rail: Manufacturer's longest lengths, with expansion type couplings, approximately 60 long, for each joint. Provide means for attaching top rail securely to each gate, corner, pull and end post.
 - 1) 1.660 OD pipe, 2.27 lbs. per ft.
 - d. Provide center brace rail for 8 foot fence.
 - 1) 1.660 OD pipe, 2.27 lbs. per ft.
 - e. All fence, posts and fittings shall be PVC coated according to the following:

Polymer Coated Color: Pipe: Polymer coated pipe shall have a PVC coating fused and adhered to the exterior zinc coating of the specified galvanized pipe. The coating shall have a minimum thickness of 10-mils (0.254 mm) in accordance with the provisions listed in ASTM F 1043. Color shall be as selected by Architect from manufacturers' standard colors complying with ASTM F934.

2.4 FITTINGS AND ACCESSORIES

- A. Material: Comply with ASTM F 626. Mill-finished aluminum or galvanized iron or steel to suit manufacturer's standards.
 - 1. Steel and Iron: Unless specified otherwise, hot-dip galvanize pressed steel or cast-iron fence fittings and accessories with at least 1.2 oz. zinc per sq. ft. as determined by ASTM A 90.
 - 2. Supplemental Color Coating: In addition to above metallic coatings, provide a 10-mil minimum polyvinyl chloride (PVC) plastic resin finish applied to exterior surfaces and, except inside cap shapes, to exposed interior surfaces. Color to match chain link fabric.
- B. Post and Line Caps: Provide weathertight closure cap for each post. Provide line post caps with loop to receive tension wire or top rail.
- C. Bottom and Center Rail: If shown on detail, same material as top rail. Provide manufacturer's standard galvanized-steel, cast-iron or cast-aluminum cap for each end. Provide bottom rail at baseball backstop only. Provide center rail at 8 ft. high fences or over.
- D. Tension or Stretcher Bars: Hot-dip galvanized steel with a minimum length 2 inches less than the full height of fabric, a minimum cross section of 3/16 inch by 3/4 inch, and a minimum of 1.2 oz.

of zinc coating per sq. ft. Provide one bar for each gate and end post, and two for each corner and pull post, except where fabric is integrally woven into the post.

- E. Tension and Brace Bands: 3/4-inch-wide minimum hot-dip galvanized steel with a minimum of 1.2 oz. of zinc coating per sq. ft.
 - 1. Tension Bands: 0.074 inch thick (14 gage) minimum.
 - 2. Brace Bands: 0.105 inch thick (12 gage) minimum.
- F. Tension Wire: 0.177-inch-diameter metallic-coated steel marcelled tension wire conforming to ASTM A 824 with finish to match fabric. Provide at all fencing except baseball backstop.
 - 1. Coating Type II zinc in the following class as determined by ASTM A 90.
 - a. Class 2, with a minimum coating weight of 1.20 oz. per sq. ft. of uncoated wire surface.
- G. Tie Wires: 0.106-inch-diameter (12-gage) galvanized steel with a minimum of 0.80 oz. per sq. ft. of zinc coating according to ASTM A 641, Class 3 or 0.148-inch-diameter (9-gage) aluminum wire alloy 1350-H19 or equal, to match fabric wire.

2.5 CONCRETE

- A. Concrete: Provide truck poured concrete consisting of portland cement per ASTM C 150, aggregates per ASTM C 33, and potable water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 3000 psi. Use at least four sacks of cement per cu. yd., 1-inch maximum size aggregate, 3-inch maximum slump.

2.6 SWING GATES

- A. All Swing gates shall be constructed in conformance with ASTM F 900.
- B. Swing Gates: Galvanized steel welded fabrication in compliance with ASTM F 900. Gate frame members 1.900 in OD (48.3 mm) ASTM F 1083 schedule 40 galvanized steel pipe. Frame members spaced no greater than 8 ft. apart vertically and horizontally. Welded joints protected by applying zincrich paint in accordance with ASTM Practice A 780. Galvanized malleable iron or heavy gauge pressed steel post and frame hinges. Match gate fabric to that of the fence system. Gateposts, ASTM F 1083 schedule 40 galvanized steel pipe. Gate post diameter to match diameter of terminal posts diameter shown on plans or chart below, which ever is greater. 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 field touch.
 - 1. Hinges: 360-degree outward swing.
 - 2. Latches permitting operation from both sides of grate with provision for padlocking accessible from both sides of gate.
 - 3. Drop bars to hold gate leaves open: one per leaf.
 - 4. Manufacturer's standard.

Gateposts: Schedule 40 pipe in compliance with ASATM F 1083.

Gate fabric height up to and including 6 ft. (1.2 m)		
Gate leaf width	Post Outside Diameter	Weight
up to 4 ft. (1.2 m)	2,375 in. (60.3 mm)	3.65 lb/ft (5.4 kg/m)
over 4 ft. to 10 ft. (1.2 to 3.05 m)	2,875 in. (73.0 mm)	5.79 lb/ft (8.6 kg/m)
over 10 ft. to 18 ft. (3.05 to 5.5 m)	4,000 in. (101.6 mm)	9.11 lb/ft (13.6 kg/m)
Gate fabric height over 6 ft. to 12 ft. (1.2 to 2.4m)		
Gate leaf width		
up to 6 ft. (1.8 m)	2,875 in. (73.0 mm)	5.79 lb/ft (8.6 kg/m)
over 6 ft. to 12 ft. (1.8 to 3.7 m)	4,000 in. (101.6 mm)	9.11 lb/ft (13.6 kg/m)
over 12 ft. to 18 ft. (2.4 to 5.5 m)	6,625 in. (168.3 mm)	18.97 lb/ft (28.2 kg/m)
over 18 ft. to 24 ft. (5.5 to 7.3 m)	8,625 in. (219.1 mm)	28.58 lb/ft (42.5 kg/m)

- C. Hinges shall be structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install fence to comply with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.
1. Apply fabric to outside of framework. Install perimeter fencing inside of property line established by survey as required by Division 1.
- B. Excavation: Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.
1. If not indicated on Drawings, excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than four times the largest cross section of post.
 2. Unless otherwise indicated, excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.
- C. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Space a maximum of 10 feet o.c., unless otherwise indicated.
1. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.
 - a. Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to a crown to shed water.

- D. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs and at other posts terminating into rail end attached to posts or post caps fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.
- E. Center Rails: Install center rails in one piece between posts and flush with post on fabric side, using rail ends and special offset fittings where necessary.
- F. Brace Assemblies: Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at midheight of fabric on fences with top rail and at two thirds fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- G. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric before stretching fabric and tie to each post with not less than same gage and type of wire. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter (11-gage) hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c.
- H. Fabric: Leave approximately 2 inches between finish grade and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains under tension after pulling force is released.
- I. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not over 15 inches o.c.
- J. Tie Wires: Use wire of proper length to secure fabric firmly to posts and rails. Bend ends of wire to minimize hazard to persons or clothing.
 - 1. Maximum Spacing: Tie fabric to line posts 12 inches o.c. and to rails and braces 24 inches o.c.
- K. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts for added security.

END OF SECTION 323113