COMMERCIAL CHAIN LINK FENCE AND GATES

SECTION 32 31 13

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. DIVISION 01 - GENERAL REQUIREMENTS: Drawings, quality, product and performance requirements, general and supplemental conditions apply as applicable to the project and project documents.

1.2 SUMMARY

A. This Section includes materials applicable for commercial chain link fence and gates. Galvanized steel coated chain link fabric
   1. Polymer coated steel chain link fabric
   2. Galvanized steel framework and fittings
   3. Polymer coated galvanized steel framework and fittings
   4. Gates: swing and cantilever slide
   5. Installation

B. Related Project Contract Sections:
   1. 01 33 23 Shop Drawings, product data
   2. 01 43 13 Manufacturers Qualifications
   3. 01 43 23 Installer Qualifications
   4. 01 45 00 Quality Control
   5. 01 66 00 Product Storage and Handling Requirements
   6. 03 30 53 Miscellaneous Cast in Place Concrete
   7. 31 22 19 Finish Grading

1.3 REFERENCES

A. ASTM F552 Standard Terminology Relating to Chain Link Fencing

B. ASTM F567 Standard Practice for Installation of Chain Link Fence

C. ASTM F626 Specification for Fence Fittings

D. ASTM F668 Specification for Polymer Coated Chain Link Fence Fabric

E. ASTM F900 Specification for Industrial and Commercial Swing Gates

F. ASTM F934 Specification for Standard Colors for Polymer-Coated Chain Link

1.4 SUBMITTALS

A. Shop drawings: Site plan showing layout of fence location with dimensions, location of gates and opening size, cleared area, elevation of fence and gates, details of attachments and footings.

B. Certifications: Manufacturers material certifications in compliance with current ASTM specifications.

C. Domestic certifications: Material certifications, Made in U.S.A., Buy American Act or Buy America when required.

D. Specification Changes: May not be made after the date of bid.

1.5 QUALITY ASSURANCE

A. Manufacturer: Company operating in the United States having U.S. manufacturing facility/facilities specializing in manufacturing chain link fence products with at least 5 years experience.

B. Fence contractor: Company with demonstrated successful experience installing similar projects and products in accordance with ASTM F567 and have at least 5 years experience.

C. Tolerances: Current published edition of ASTM specifications tolerances apply. ASTM specification tolerances supersede any conflicting tolerance.

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver products to site per contract requirements.

B. Storage: Store and protect products off the ground when required.

PART 2 – PRODUCTS 2.1

CHAIN LINK FABRIC

A. Polymer Coated Steel Fabric: ASTM F668, 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
    d. Color: **black** in compliance with ASTM F934

    1. 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, K&K.

2.2 STEEL FENCE FRAMEWORK

A. Rolled-Formed line posts and rail: light industrial/commercial fence refer to ASTM F1043 Light Industrial/Commercial Fence Framework; Rolled formed posts Group II-L, and Alternate posts Group IV-L

1. Line post dimensions: Refer to Table 2
2. Top, brace, bottom: 1.625 x 1.25 in. (41.2 x 31.7 mm), 1.35 lb/ft (2.01kg/m).

Table 1:

Mesh Size	**9 gauge**
Inches (mm)	0.148 in.
	(3.76 mm)
1 3/4 (44.5)	**Tennis court fabric**

TABLE 2 Line post selection guideline

Fence Fabric	*Group IA ASTM F1083 Sch. 40 Pipe*	*Group IC Elec. Resistance Welded Pipe*	*Group II Rolled Formed C-Section*
	Minimum	*Minimum*	*Minimum*
over 8 ' 0" to 10' 0"	***2.875"***	***2.875"***	***2.250x1.700"***
over 10' 0" to 12' 0"	*3.500"*	*2.875"*	*3.250x2.500"*

D. Polymer Coated Framework: Polymer coated framework shall have a 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) per ASTM F1043. Color to match fabric **black** per ASTM

2.3 TENSION WIRE

A. Polymer Coated Steel Tension Wire: 7 gauge (0.177 in.) (4.50 mm) wire complying with ASTM F1664. Wire gauge specified is the core wire gauge. **Match coating class and color to that of the chain link fabric** Class 1, extruded
   1. Class 2a, extruded and adhered
   2. Class 2b, fused and adhered,

2.4 FITTINGS

A. Tension and Brace Bands: Galvanized pressed steel complying with ASTM F626, 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).

B. Terminal Post Caps, Line Post Loop Tops, Rail and Brace Ends, Boulevard Clamps, Rail Sleeves: In compliance to ASTM F626, pressed steel galvanized after fabrication having a minimum zinc coating of 1.20 oz/ft² (366 g/m²).

C. Truss Rod Assembly: In compliance with ASTM F626, 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: In compliance with ASTM F626. 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. Polymer Coated Color Fittings: In compliance with ASTM F626. Polymer coating minimum thickness 0.006 in. (0.152 mm) fused and adhered to zinc coated fittings F934.

2.5 TIE WIRE and HOG RINGS

Tie wire and hogs rings per ASTM F626. Standard applications: 9 gauge (0.148 in.) (3.76 mm) aluminum alloy ties, 9 gauge (0.148 in.) (3.76 mm) aluminum alloy hog rings [polymer coated; match the coating, class and color to that of the chain link fabric

2.6 SWING GATES

A. Swing Gates: single and double see plans. Galvanized steel welded fabrication in compliance with ASTM F900. Gate frame members 1.900 in. OD (48.3 mm) ASTM F1043 Group IA F1083 schedule 40 pipe**.** Frame members spaced no greater than 8 ft. (2440 mm) apart vertically and horizontally. Welded joints protected by applying zinc-rich paint in accordance with ASTM Practice A780. 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. **A**STM F1043 Group IA ASTM F1083 schedule 40 pipe. Select the gatepost outside diameter from table 2.9 B 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

[Swing gate post size per ASTM F900]

Gate fabric height up to and including 6 ft. (1.2m)	
Gate leaf width	**Post Outside Diameter**
up to 4 ft. (1.2 m)	2.375 in. (60.3 mm)
over 4 ft. to 10 ft. (1.2 to 3.05 m)	2.875 in. (73.0 mm)
over 10 ft. to 18 ft. (3.05 to 5.5 m)	4.000 in. (101.6 mm)
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)
over 6 ft. to 12 ft. (1.8 to 3.7 m)	4.000 in. (101.6 mm)
over 12 ft. to 18 ft. (2.4 to 5.5 m)	6.625 in. (168.3 mm)
over 18 ft. to 24 ft. (5.5 to 7.3 m)	8.625 in. (219.1 mm)

2.7 CONCRETE

Concrete for post footings shall have a 28-day compressive strength of 2,500 psi. (17.2 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. The contract drawings indicate the extent of the area to be cleared.

3.2 FRAMEWORK INSTALLATION

A. Posts: Posts shall be set plumb in concrete footings in accordance with ASTM F567. Minimum footing depth, 24 in. (609.6 mm) plus an additional 3 in. (76.2 for each 1 ft. (305 mm) increase in the fence height over 4 ft. (1220 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; minimum requirements are listed in ASTM F567. Top of post concrete footing to be **at grade** 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 theline post or barb arm loop top. Splice rail using top rail sleeves minimum 6 in. (152 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.

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. The horizontal brace rail and diagonal truss rod shall be installed in accordance with ASTM F567.

D. Tension wire: Shall be installed 4 in. (101.6 mm) up from the bottom of the fabric. Fences without top rail shall have a tension wire installed 4 in. (101.6 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. (457.2 mm) on center and to each line post with a tie wire

3.3 CHAIN LINK FABRIC INSTALLATION

Chain Link Fabric: Install fabric to **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. (7.94 mm) carriage bolts spaced no greater than 12 inches (304.8mm) 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 (50mm) by 3/16 in. (4.76 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 (304.8 mm) on center and to rail spaced no greater than 18 inches (457.2 mm) on center. Secure fabric to the tension wire with hog rings spaced no greater than 18 inches (457.2 mm) apart. Pre-formed 9-gauge galvanized steel power-fastened tie wire shall be wrapped 360 degrees around the post or rail and fabric picket, twist the two wire ends together three full turns per ASTM F567. Excess wire shall be cut off and bent over to prevent injury. The installed fabric shall have a ground clearance on no more than 3/4 inch.

3.4 GATE INSTALLATION

A. Swing Gates: Installation of swing gates and gateposts in compliance with ASTM F567. Direction of swing shall be **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. (609.6 mm) deep. Gate leaf holdbacks shall be installed for all double gates**.**

3.5 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.

3.6 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 OF SECTION 32 31 13