

SECTION 323113

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Chain link fence framework, fabric, and accessories.
2. Excavation for post bases, concrete footings for posts, and center drop for gates.
3. Chain link manual and motorized gates and related hardware.

B. Related Sections:

1. Section 033000 - Cast-In-Place Concrete: Post footings.
2. Section 281304 – Physical Access Control System
3. Section 270500 - Common Work Results for Communications.
4. Section 271500 – Communications Horizontal Cabling.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 90 - Tests for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
2. ASTM A 116 - Specification for Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric.
3. ASTM F 1184 - Specification for Industrial and Commercial Horizontal Slide Gates, Type II, Class 2.
4. ASTM A 123 - Specification for Zinc (Hot- Dip Galvanized) Coatings on Iron and Steel Products.
5. ASTM A 392 - Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
6. ASTM F 567 - Standard Practice for Installation of Chain Link Fence.
7. ASTM A 824 - Specification for Metallic-Coated Steel Marcellled Tension Wire Use with Chain Link Fence.
8. ASTM F 1043 - Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
9. ASTM F 900 - Specification for Industrial and Commercial Swing Gates.
10. ASTM F 1083 - Specification for Pipe, Steel, Hot-Dipped Zinc Coated (Galvanized) Welded, For Fence Structures.
11. ASTM F 2200 – Specification for gates to be automated.

B. Underwriter's Laboratories (UL):

1. UL325, Door, Drapery, Gate, Louver, Window Operators, and Systems.

C. Chain Link Fence Manufacturer's Institute (CLFMI):

1. CLF-PM0610 (July 2011) - Product Manual.

1.3 SUBMITTALS

A. Procedures for submittals.

1. Product Data: Submit product data for fabric, posts, accessories, fittings, and hardware.
2. Shop Drawings: Include plan layout, grid, spacing of components, accessories, fittings, hardware, anchorage's, and schedule of components.
3. Assurance/Control Submittals:
 - a. Certificates: Manufacturer's certificate certifying that Products meet or exceed specified requirements.
 - b. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with CLFMI PM.
- B. Installer Qualifications: Company specializing in performing the Work of this Section with minimum 5 years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site, store, and protect products.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
 - 1. Allied Tube & Conduit, Harvey, IL (800) 882-5543.
 - 2. Anchor Fence Division, Master-Halco, Incorporated, Baltimore, MD (800) 229-5615.
 - 3. Merchant's Metals, Houston, TX (800) 254-0080.
 - 4. The Tymetal Corporation, Fort Miller, NY (518) 695-9000.
 - 5. HySecurity, Kent, Washington, (800) 321-9947.
- B. Product Requirements: Product options and substitutions. Substitutions: Permitted.

2.2 MATERIALS

- A. Conform to CLFMI Product Manual.
- B. Steel Framing:
 - 1. Type I: ASTM F 1083 Schedule 40, standard weight galvanized steel pipe, welded construction, minimum yield strength of 25 ksi; coating conforming to ASTM F 1043 Group IA on pipe exterior and interior.
 - 2. Type II: ASTM F 1043, cold-formed and welded galvanized steel pipe with minimum yield strength of 50 ksi; coating conforming to ASTM F 1043 Group IC on pipe exterior and Group ID on pipe interior.
 - 3. Type III (Roll-formed "C" sections): ASTM F 1043, cold-formed galvanized steel post cold-formed and welded galvanized steel pipe with minimum yield strength of 45 ksi ; coating conforming to ASTM F 1043 on post exterior and interior.
- C. Fabric: ASTM A 392; **Class 2: 2 ounce zinc** 9 gage (0.148 inch diameter) galvanized steel wire, 2 inch diamond mesh interwoven wire, top and bottom selvages knuckled or knuckled and twist.

2.3 MIXES

- A. Footing Concrete: 3,000 psi Portland cement concrete.
- B. Grout: Premixed, factory-packaged, non-staining, non-corrosive grout. Provide type formulated for exterior application.

2.4 COMPONENTS

- A. End, Corner, and Pull Posts: Minimum sizes and weights as follows:
 - 1. Up to 6 Foot Fabric Height:
 - a. Type I Posts: 2.375 inch outside diameter pipe, 3.65 pounds per lineal foot.
 - b. Type II Posts: 2.375 inch outside diameter pipe, 3.12 pounds per lineal foot.

2. Over 6 Foot to 13 Foot Fabric Height:
 - a. Type I Posts: 2.875 inch outside diameter pipe, 5.79 pounds per lineal foot.
 - b. Type II Posts: 2.875 inch outside diameter pipe, 4.64 pounds per lineal foot.
 3. 13 Foot and Over Fabric Height (If required):
 - a. Type I Posts: Round; 4.0 inch outside diameter pipe, 9.10 pounds per lineal foot.
 - b. Type II Posts: 4.0 inch outside diameter pipe, 6.56 pounds per lineal foot.
- B. Line (Intermediate) Posts: Minimum sizes and weights as follows:
1. Up to 6 Foot Fabric Height:
 - a. Type I Posts: Round; 1.90 inch outside diameter pipe, 2.72 pounds per lineal foot.
 - b. Type II Posts: 1.90 inch outside diameter pipe, 2.28 pounds per lineal foot.
 - c. Type III Posts: 1.875 inch x 1.625 inch, 2.28 pounds per lineal foot.
- C. Swinging Gate Posts: For leaf widths, as follows:
1. Up to 4 Feet Width:
 - a. Type I Posts: 2.875 inch outside diameter pipe, 5.79 pounds per lineal foot.
 - b. Type II Posts: 2.875 inch outside diameter pipe, 4.64 pounds per lineal foot.
 2. Between 4 Feet and 10 Feet Width:
 - a. Type I Posts: Round; 4.00 inch outside diameter pipe, 9.10 pounds per lineal foot.
 - b. Type II Posts: 4.00 inch outside diameter pipe, 6.56 pounds per lineal foot.
 3. Between 10 Feet and 15 Feet Width:
 - a. Type I Posts: 6.625 inch outside diameter pipe, 8.97 pounds per lineal foot.
- D. Sliding Gate Posts:
1. All leaf widths:
 - a. Type I Posts: Round; 4.00 inch outside diameter pipe, 9.10 pounds per lineal foot.
 - b. Type II Posts: 4.00 inch outside diameter pipe, 6.56 pounds per lineal foot.
- E. Bottom Rail and Intermediate Rails: Manufacturer's longest lengths.
1. Typical:
 - a. Type I: Round; 1.66 inch outside diameter pipe, 2.27pounds per lineal foot.
 - b. Type II: 1.66 inch outside diameter pipe 1.83 pounds per lineal foot.
 - c. Type III Posts: 1.625 inch x 1.25 inch, 1.37 pounds per lineal foot.
 2. Couplings: Expansion type, approximately 6 inches long.
 3. Attaching Devices: Means of attaching bottom rail securely to each gate, corner, pull, and end post.
- F. Swinging Gate Hardware:
1. Hinges: Size and material to suit gate size; offset to permit 180-degree gate opening. Provide 1-1/2 pair of hinges for each leaf over 6-foot 0-inch nominal height.
 2. Latch: Forked type or plunger-bar type to permit operation from both sides of gate, with padlock eye.
 3. Double Gate Hardware: In addition to the above, provide gate stops for double gates, consisting of mushroom type flush plate with anchors set in concrete to engage center drop rod or plunger bar. Configure for use of one padlock to lock both gate leaves.
- G. Sliding Gate Hardware:
1. Provide manufacturer's standard heavy-duty track, ball-bearing hanger sheaves, overhead framing and supports, guides, stays, bracing, and accessories required. Tymetal, Fortress type gate is basis of design. Gates may not exceed 30 feet in width.
 2. For 10 feet to 30 feet opening:
 - a. Frame shall be fabricated from 6063-T6 aluminum alloy extrusion. The top member shall be 3-inch x 5 inch aluminum structural channel/tube extrusion weighing not less than 3.9 lbs/lf. The top member shall be "keyed" to interlock with the "keyed" track member. The bottom member shall be a single horizontal aluminum structural tube weighing not less than 2.0 lbs/lf

- or a spliced 2 inch x 5 inch aluminum structural channel weighing not less than 2.65 lbs/lf. The two horizontal sections may be spliced in the field.
- b. SPLICING: A 1/4 inch x 5 inch x 24 inch galvanized steel splice plate shall be used to secure the two 5 inch channel bottom members together utilizing eight 3/8 inch x 1 1/2 inch plated carriage bolts with lock nuts. The top members shall be spliced together on the side opposite the track member using a 1/4 inch x 2 inch x 24 inch aluminum splice plate secured with six 1/4 inch x 1/2 inch drive rivets on one side and welded to the top member on the other side. On the track side, the track is to be overlapped 24 inch onto the opposing section, interlocked with the top member and vertically secured in place using six 1/4 inch x 1/2 inch drive rivets and horizontally secured in place using six 5/16 inch x 1 inch plated hex head cap screws. The respective splice end vertical member shall be 1 inch x 2 inch, weighing not less than 0.82 lbs/lf. The 1 inch x 2 inch members will be joined utilizing 5/16 inch x 2 3/4 inch plated hex head cap screws, quantity varying by height of gate.
 - c. The vertical members shall alternate between 2 inch x 2 inch and 1 inch x 2 inch in cross section weighing not less 1.1 lbs/lf and 0.82 lbs/lf respectively. The spacing for the vertical intermediates shall be no greater than half the height of the gate.
 - d. The gate frame shall have a separate semi-enclosed "keyed" track, extruded from 6105-T5 aluminum alloy, weighing not less than 2.9 lbs/lf. Track member to be located on only one side of the top member. When interlocked with the "keyed" top member and welded to it, it forms a composite structure with the top of the gate frame. Welds to be placed alternately along the top and side of the track at 9 inch centers and a minimum of 2 inches long.
 - e. The gate frame is to be supported from the track by two swivel type, self aligning, 4-wheeled, sealed lubricant, ball-bearing truck assemblies.
 - f. Diagonal "X" bracing of 3/16 inch minimum diameter stainless steel aircraft cable shall be installed to brace the gate panels and to provide a ready means of vertical alignment.

2.5 ACCESSORIES

- A. Sleeves: Galvanized steel pipe with inside diameter not less than 1/2 inch greater than outside diameter of fence posts. Provide steel plate closure welded to bottom of sleeves of width and length not less than 1 inch greater than outside diameter of sleeve.
 1. Up to 6 Foot Fabric Height: Provide sleeve not less than 12 inches long.
- B. Tension Wire: 7 gage steel, metallic-coated coil spring wire, in accordance with ASTM A 824, located at the top of fence fabric.
- C. Wire Ties: 11 gage galvanized steel.
- D. Post Brace Assembly: Manufacturer's standard adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same materials as top rail for brace, and truss to line posts with 0.375 inch diameter rod and adjustable tightener.
- E. Post Tops: Galvanized steel, weather tight closure cap for tubular posts, one cap for each post. Furnish cap with openings to permit passage of top rail.
- F. Stretcher Bars: Galvanized steel, one piece lengths equal to full height of fabric; with minimum cross section of 3/16 inch x 3/4 inch. Provide one stretcher bar for each gate and end post, one for each bottom rail, and two for each corner and pull post.
- G. Stretcher Bar Bands: Manufacturer's standard.
- H. Gate Cross-Bracing: 3/8 inch diameter galvanized steel adjustable length truss rods.

2.6 FABRICATION

- A. Fabricate swing gate perimeter frames of 1.90 inch outside diameter galvanized steel pipe. Provide horizontal and vertical members to ensure proper gate operation and for attachment of fabric, hardware, and accessories. Space frame members maximum 8 feet apart.
- B. Assemble gate frames rigidly by welding or with special fittings and rivets. Use same fabric as for fence. Install fabric with stretcher bars at vertical edges. Bars may also be used at top and bottom edges. Attach stretchers to frame at not more than 15 inches on center. Install diagonal cross-bracing on gates as required to ensure frame rigidity without sag or twist.
- C. Attach hardware to provide security against removal or breakage.

2.7 FINISHES

- A. All fence posts, fabric, and accessories shall be galvanized.

2.8 GATE OPERATORS

- A. Gate operators must conform to UL325, Standards for Safety. The operator must be tested by an independent testing laboratory such as UL or ETL and found to conform to these standards. The completed installation shall conform to applicable ASTM and UL requirements.
- B. Basis of Design: HySecurity Slide Driver Unit.
- C. All electrical work is to be done by qualified electricians and is to conform to all applicable local, state, and federal codes.
- D. General Operation
 - 1. The operator must be designed for high-cycle applications and low maintenance. The operator shall be capable of actuating gates up to 30 feet in overall length. The gate operator must be able to operate gates up to 150 per cent of weight of actual gate at 2.2feet (66 cm) per second.
 - 2. All fasteners, except structural bolts, are to be stainless steel, or other non-corrosive material.
 - 3. The operator is to provide wear compensating, spring-loaded, friction-feed type drive mechanism. The drive mechanism is to consist of two drive wheels that can be manually disconnected by a toggle style disconnect. This disconnect is to instantly disengage the drive wheels for manual operation. The operator, upon returning to automatic operation by engaging the drive mechanism, shall function properly without regard to the gate's actual position.
- E. Housing Construction
 - 1. The housing cover must swing open to allow access to the internal components.
 - 2. The housing cover must be lockable.
 - 3. All operator cover locks are to be keyed alike.
 - 4. The housing, chassis and cover to be galvanized for corrosion resistance per ASTM 123 M.
- F. Electric Motor
 - 1. The electric motor used in the gate operators must have a continuous-duty rating of two horsepower with a service factor of 1.15 or greater and shall be available in all voltages and phases to suit the installation requirements of the site.
 - 2. The electric motors must have built-in overload protection and resettable with a sealed pushbutton reset.
- G. Hydraulic System
 - 1. The hydraulic system must be self-contained and contain pump, reservoir, two position control valve, hydraulic hoses, fittings and hydraulic motors.
 - 2. All hydraulic hoses shall have a minimum burst pressure of 12,000 pounds per square inches.

3. The hydraulic motors must be automatically locked when the control valve is in the de-energized to prevent slippage of the drive wheels.
4. The hydraulic system must be soft-start and soft-stop to minimize shock loads transmitted to the gate system including a reverse delay to maximize gate hardware life.

H. Electrical

1. Built in "warn before operate" system.
2. Anti-tailgate mode.
3. 26 programmable user relay output options.
4. Built-in power surge/lightning strike protection.
5. Control circuit: 24VDC.
6. Electrical enclosure: Oversized, metal, with hinged lid gasketed for protection from intrusion of foreign objects, and providing ample space for the addition of accessories.
7. Menu configuration, event logging and system diagnostics easily accessible with integral touchpad or a PC and free START software.
8. Limit switch shall feature a built in LED "tripped" indicator light. The limit switch must readily accessible, adjustable and replaceable with normal hand tools.
9. The limit switches are to provide the ability to remote monitor the gate position when in the fully closed and fully open positions.
10. Provide individual surge protection at both ends of all power and low voltage controls conductors serving the gate operator(s). Refer to Section 281304.

I. Accessories

1. Through beam type photo eyes.
2. Heater with thermostat for cold damp climates.
3. Snow brushes and blades for cold snowy climates
4. Strobe or other similar visual beacon to operate simultaneously with standard gate operator "warn before operate" audible beacon.

J. Inductive vehicle loop detectors

1. Inside and outside obstruction loops are to be installed to prevent the gate from closing when vehicle traffic is present. Anti-Tailgating logic is to be applied to entrance lane gates.
2. Free exit loops are to be installed for exit lane gates.
3. Loops for gates with heavy truck traffic will have no side of the loop less than 6'.
4. Loop wire to be stranded Thhn or XLPE, crosslink poly-ethelene jacketed type acceptable for direct burial.
5. Refer to detail drawings for specific loop placement or refer to manufacturers recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Execution Requirements: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

3.2 INSTALLATION

- A. Install fence in accordance with ASTM F 567 and manufacturer's published instructions.

- B. Install gates in accordance with ASTM F 900, ASTM F2200 or ASTM 1184 as applicable and to manufacturer's published instructions.
- C. Space line posts 10 feet 0 inches on center maximum, unless otherwise indicated on Drawings.
- D. Grade-set Posts:
 1. Drill or hand excavate.
 2. Excavate each post hole to 12 inch diameter, or not less than four times diameter of post.
 3. Excavate approximately 3 inches lower than post bottom; set post bottom not less than 36 inches below finish grade.
 4. Hold post in position while placing, consolidating, and finishing concrete.
- E. Sleeve-set Posts: Anchor posts in concrete by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with grout, mixed and placed to manufacturer's recommendations.
- F. Rails: Run rail between post, bending smoothly for curved runs located at the bottom of the fence fabric. Provide expansion couplings as recommended by fencing manufacturer.
- G. Center Rails: Provide center rails where indicated. Install in one piece between posts and flush with post on fabric side, using offset fittings where necessary.
- H. Brace Assemblies: Install braces so posts are plumb with rod in tension.
- I. Tension Wire: Install tension wires through post cap loops before stretching fabric and tie to each post cap with not less than 6 gage galvanized wire. Fasten fabric to tension wire using 11 gage galvanized steel hog rings spaces 24 inches on center.
- J. Fabric: The fence fabric must be installed within 2 inches between finish grade and bottom selvage. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on the exterior side of the fence, and anchor to framework so fabric remains in tension after pulling force is released.
- K. Stretcher Bars: To secure end, corner, pull, and gate posts, thread through or clamp to fabric 4 inches on center and secure to posts with metal bands spaced 15 inches on center.
- L. Tie Wires:
 1. Use U-shaped wire conforming with diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted two full turns. Bend wire ends to minimize hazards to persons or clothing.
 2. Tie fabric to line posts with wire ties spaced 12 inches on center. Tie fabric to rails and braces with wire ties spaced 24 inches on center. Manufacturer's standard procedure will be accepted if of equal strength and durability.
- M. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.
- N. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation.

3.3 CONSTRUCTION

- A. Site Tolerances:
 1. Maximum Variation from Plumb: 1/4 inch.
 2. Maximum Offset from True Position: 1 inch.
 3. Locate fencing components completely within site boundaries. Do not infringe adjacent property lines.
 4. Maximum Fence Distance from Ground: 1 1/2 inches.

5. Maximum Gate Distance from Ground: 4 inches.

B. Gate Operator:

1. Coordinate conduit runs and electrical connections with Access Control Section 281304, Common Work Results for Communications Section 270500, and Communications Horizontal Cabling Section 271500.

3.4 FIELD QUALITY CONTROL

A. Test gate operator through ten full cycles and adjust for operation without binding, scraping or uneven motion. Test limit switches for proper "at rest" gate position.

B. All anchor bolts shall be fully concealed in the finished installation. Owner, or owner's representative, shall complete "punch list" with installing contractor prior to final acceptance of the installation and submit completed warranty documentation to manufacturers where applicable.

3.5 CONTINUED SERVICE AND DOCUMENTATION

A. Train owner's personnel on how to safely shut off electrical power, release and manually operate the gates. Additionally, demonstrate the general maintenance of the gate operator and accessories and provide one copy of "Installation and Reference" manual for the owner's use (a second manual is available upon request). Manuals will identify parts of the equipment for future procurement. Direct maintenance personnel to HySecurity's website, specifically the technical support sections.

END OF SECTION