# SECTION 02830 (32 31 13)

## CHAIN LINK FENCES AND GATES

1. GENERAL

SECTION INCLUDES

Fence framework, fabric, and accessories.

Excavation for post bases and concrete foundations for posts.

Concrete anchorage for posts.

* 1. SECTION INCLUDES
		1. Section 01572-Construction Waste Management.

SUBMITTALS

Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

Product Data: Provide data on fabric, posts, accessories, fittings and hardware, and the following information:

* + - 1. Recycled Content:
				1. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
				2. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
				3. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
				4. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

Samples: Submit two samples of fence fabric, 12 inches x 12 inches in size illustrating construction and finish.

Manufacturer's Installation Instructions: Indicate installation requirements, post foundation requirements.

QUALITY ASSURANCE

References:

* + - 1. ASTM A53-Standard Specification for Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
			2. ASTM A123-Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
			3. ASTM A392-Standard Specification for Zinc Coated Steel Chain-Link Fence Fabric.
			4. ASTM A641-Zinc coated (Galvanized) Carbon Steel Wire.
			5. ASTM C94-Ready-mixed Concrete.
			6. ASTM F567-Standard Practice of Installation of Chain-Link Fence.
			7. ASTM F668-Poly (Vinyl Chloride) (PVC) and Other Organic Polymer-Coated Steel Chain Link Fence Fabric.
			8. ASTM F900 Standard Specification for Industrial & Commercial Swing gates.
			9. ASTM F1083-Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.

Manufacturer: Company specializing in commercial quality chain link fencing with minimum 3 years experience.

Perform work complying with provisions of ASTM F567, and as specified in this section.

1. PRODUCTS

MANUFACTURERS

* + 1. Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
			1. Stephens Pipe & Steel, LLC.
			2. Master-Halco.
			3. Merchants Metals a Division of MMI Products, Inc.
		2. Substitutions:
			1. Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.

MATERIALS

* + 1. All chain link fabric, posts, accessories, fittings, and hardware products shall contain recycled content.
	1. CHAIN LINK FENCE
		1. Fabric:
			1. Wire: No. 9 gage (.148 inch diameter), 2-inch mesh galvanized fabric with knuckled selvages top and bottom.
				1. Wire at Site Perimeter Fences: No. 11 gage (.120 inch diameter), 2 inch galvanized mesh fabric with knuckled selvages top and bottom.
				2. Wire at Baseball Backstops: No. 6 gage (.192 inch diameter), 2 inch galvanized mesh fabric with knuckled selvages top and bottom.
			2. Galvanized Base Coating: Under provisions of ASTM A641.71a, 1.2 ounces/square foot.
			3. Fusion-Bonded Vinyl Coating: Where vinyl coated fencing is specified or indicated on the Drawings it shall be fusion-bonded type, comply with ASTM F668, Standard Industrial, Class 2B, with thickness of vinyl coating between 0.006 and 0.010 inches. Core wire to be 6 or 9 gage galvanized in accordance with ASTM A641. Color: Black
				1. Fence System Color: When vinyl coated fabric is used, the remainder of the fence system (such as posts, rails, braces, frames, wires, caps, gates, gate hardware, accessories, etc.) shall receive polyester powder coating, with the color to match the chain-link fabric.
		2. Bottom Tension Wire: 6 gage (.192 inch diameter), attached to fence fabric with hog rings at 24 inches on center. Tension wire and hog rings: Finish shall match fabric.
		3. Posts, top rails, braces, and gate frames: Schedule 40, type E or S, grade B galvanized pipe per ASTM A53, sizes as follows:
			1. Line Posts (maximum spacing 10 feet), End or Corner Posts (Braces to be provided at both) as listed in the table below:

|  |  |  |
| --- | --- | --- |
| Fence height | Line posts: | End or corner posts: |
| 4 ft | 2" nominal diameter (2 3/8" O.D.) | 2**½**" nominal diameter (2 7/8" O.D.) |
| 6 ft | 2" nominal diameter (2 3/8" O.D.) | 2**½**" nominal diameter (2 7/8" O.D.) |
| 8 ft | **3" nominal diameter (3 ½” O.D.)** | **3½” nominal diameter (4" O.D.)** |
| 10 ft | **3½” nominal diameter (4" O.D.)** | 6" nominal diameter (6 5/8" O.D.) |
| 12 ft | 6" nominal diameter (6 5/8" O.D.) | 6" nominal diameter (6 5/8" O.D.) |

* + - 1. Gate Posts: As scheduled below (see 2.2.E).
			2. Top Rails: 1-1/4 inch nominal diameter (1-5/8 inch O.D. - 2.27 lbs/foot).
			3. Mid Rails: 1-1/4 inch nominal diameter (1-5/8 inch O.D. - 2.27 lbs/foot).
			4. Bottom Rails: 1-1/4 inch nominal diameter (1-5/8 inch O.D. - 2.27 lbs/foot).
			5. Braces: 1-1/4 inch nominal diameter (1-5/8 inch O.D. - 2.27 lbs/foot).
			6. Fences greater than 12 feet in height (and their foundations) shall be designed by a Florida Licensed Professional Engineer in accordance with the provisions of the Florida Building Code. Provide an Engineered Shop Drawing and/or supporting calculations.
		1. Gate Frames: ASTM F900, for fabrication only, use 1-1/2 inch nominal, 1-7/8 inch O.D. schedule 40 galvanized pipe with welded corner connections and welded diagonal 1-1/4 inch nominal diameter (1-5/8 inch O.D.) pipe bracing. Paint all welds with galvanic paint, 2 coats.
		2. Gate Posts for swing gates:
			1. Use pipes of nominal sizes as listed on table below for each fence height and gate leaf width:

|  |  |  |
| --- | --- | --- |
| Fence height  | Gate leaf width: | Gate post (Schedule 40, type E or S, grade B galvanized pipe - ASTM A53): |
| 4 ft or 6 ft | up to 6ft wide (inclusive) | 2**½**” nominal diameter (2 7/8" O.D.) |
| 4 ft or 6 ft | over 6ft to 12ft wide (inclusive) | 3" nominal diameter (3 1/2" O.D.) |
| 4 ft or 6 ft | over 12ft to 18ft wide (inclusive) | 3**½**" nominal diameter (4" O.D.) |
| 8 ft | **up to 12ft wide (inclusive)** | **3½” nominal diameter (4" O.D.)** |
| 8 ft | **over 12ft to 18ft wide (inclusive)** | 6" nominal diameter (6 5/8" O.D.) |
| **10ft or 12ft** | **up to 18ft wide (inclusive)** | **6" nominal diameter (6 5/8" O.D.)** |

* + 1. Fabric Connections:
			1. Securely fasten fabric to all terminal posts with 3/16 inch x 5/8-inch tension bars and beveled edge 11-gage tension bands.
			2. Number of tension bands: One band less than the height of the fabric in feet for each tension bar.
			3. Fasten all fabric to intermediate posts with vinyl coated 9-gage galvanized wires not to exceed 12 inches apart. Fasten tie wire to fence fabric with 1-1/2 inch full turns minimum.
			4. Tie fabric to top rail with 9-gage galvanized wire not to exceed 24 inches apart. Fasten tie wires to fabric with 1-1/2 inch full turns minimum.
			5. Fasten bottom edge of fabric to bottom tension wire using hog rings at intervals not to exceed 24 inches on center.
			6. Aluminum ties are not acceptable.
		2. Braces:
			1. Securely fastened to posts by 11 gage pressed steel beveled bands and malleable fittings, then securely trussed from the line post to base of terminal post with a 3/8 inch truss rod and tightener.
			2. Braces are required only in heights of 6 feet and higher.
			3. Brace pipe: the same as top rail and installed midway between the top rail and the ground and extend from the terminal post to the first adjacent line post.
			4. Truss bracing: Provided in panels adjoining all end, corner and gate posts.
		3. Intermediate Post Tops: Malleable iron with no points on top.
		4. Hinges: Malleable Iron, hot dipped galvanized:
			1. Heavy 90 degrees Industrial Box Hinge, with 180 degree offset adaptor.
		5. Latches: Malleable Iron, hot dipped galvanized
			1. Industrial Fork Latch combined with back latch attached.
		6. Gate Holdbacks w/ Duck Bill: One per each gate leaf.
		7. Fence and Gate Height: As shown on drawing. Gates to be same height as fence.
	1. CONCRETE FOR POST SETTING: ASTM C94; normal Portland cement, 3,000 psi strength at 28 days, 4 inch slump.
1. EXECUTION

INSTALLATION

Post Installation:

* + - 1. Provide posts for fencing along lines indicated. Space posts evenly, maximum 10 feet on center, carefully aligned and plumb in every direction.
			2. Post Setting: Extend post to six inches from foundation bottom. Extend foundation to 2 inch below finish grade. Trowel crown and slope foundation away from post.
			3. Coordinate with Project Consultant concerning any obstacles or obstructions in line of fencing.
			4. At foundations that will be located under a concrete slab, provide sleeves for future fence foundations, if fence will be installed after the concrete slab.

Adjust hardware for smooth operation and lubricate where necessary.

Foundation Size

* + - 1. Concrete foundation size for line or terminal posts shall comply with the following table based on fence height:

|  |  |
| --- | --- |
| Fence height | footing dimensions (inches) |
| diameter | depth |
| 4 ft or 6 ft | 12 | 30 |
| 8 ft | 18 | 36 |
| 10 ft | 21 | 42 |
| 12 ft | 24 | 42 |

Note: Fences greater than 12 feet in height (and their foundations) shall be designed by a Florida Licensed Professional Engineer in accordance with the provisions of the Florida Building Code. Provide an Engineered Shop Drawing and/or supporting calculations.

* + - 1. Concrete foundation size for gate posts shall comply with the following based on Gate Leaf width and maximum allowable height:

|  |  |  |
| --- | --- | --- |
| Fence height | Gate leaf widths | footing dimensions (inches) |
| diameter | depth |
| 4 ft or 6ft | up to 6ft wide (inclusive) | 12 | 30 |
| 4 ft or 6ft | over 6ft to 18ft wide (inclusive) | 18 | 36 |
| 8 ft | up to 6ft wide (inclusive) | 18 | 36 |
| 8 ft | over 6ft to 12ft wide (inclusive) | 21 | 42 |
| 8 ft | over 12ft to 18ft wide (inclusive) | 24 | 42 |
| 10 ft | up to 6ft wide (inclusive) | 21 | 42 |
| 10 ft | over 6ft to 12ft wide (inclusive) | 24 | 42 |
| 10 ft | over 12ft to 18ft wide (inclusive) | 27 | 48 |
| 12 ft | up to 6ft wide (inclusive) | 24 | 42 |
| 12 ft | over 6ft to 12ft wide (inclusive) | 27 | 48 |
| 12 ft | over 12ft to 18ft wide (inclusive) | 30 | 54 |

Note: A Florida Licensed Professional Engineer shall design gates, gate posts and their foundations with a leaf width and height outside these parameters. Design shall be in accordance with the provisions of the Florida Building Code. Provide and Engineered Shop Drawing and/or Supporting Calculations.

Top and Bottom Rail:

* + - 1. Provide continuous top rail through line posts.
			2. Rigidly connect top rail to all end, corner, and gate posts.
			3. Level site: Install top rail level. Varying ground slopes: Install top rail with continuous even gradient from corner to corner. Roller coaster installation: Not permitted.
			4. Provide bottom rail at bus barriers.

Mid Rail:

* + - 1. At 8 feet high and over fences provide mid rails.

Chain Link Fabric:

* + - 1. Install with fabric top flush to top rail with bottom of fabric 1 inch (+/- 1/2 inches) above finished grade.
			2. Stretch fabric tightly to eliminate sags and buckles.
			3. Refer to paragraph 2.2 above for fabric fastening.

Gates:

* + - 1. Fabricate and install gates to prevent sagging conditions.
			2. Install gates square, level, and plumb.
			3. Install ground-set items in concrete for anchorage.
			4. Permanently fasten hasp and staple combination for locking gates and hold open feature in place.

Bottom Tension Wire

* + - 1. Install bottom tension wire and mechanically tension for very tight installation.
			2. Use tension bands for attachment of tension wire to end and corner posts at each straight run of fence.

END OF SECTION