

SECTION 32 31 13

CHAIN LINK FENCE AND GATES 2015

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 [Delete items not included in specification]

- A. This Section includes industrial/commercial chain link fence and gates specifications:
 - 1. Galvanized steel coated chain link fabric
 - 2. Aluminum coated steel chain link fabric
 - 3. Polymer coated steel chain link fabric
 - 4. Zinc 5% Aluminum alloy coated steel chain link fabric
 - 5. Galvanized steel framework and fittings
 - 6. Polymer coated galvanized steel framework and fittings
 - 7. Gates: swing and cantilever slide
 - 8. Barbed wire
 - 9. Barbed tape
 - 10. Installation
- B. Related Sections: [Delete sections not included in specification]
 - 1. 01 33 13 Certificates
 - 2. 01 33 23 Shop Drawings, product data
 - 3. 01 43 13 Manufacturers Qualifications
 - 4. 01 43 23 Installer Qualifications
 - 5. 01 45 00 Quality Control
 - 6. 01 65 00 Product Delivery Requirements
 - 7. 01 66 00 Product Storage and Handling Requirements
 - 8. 03 30 53 Miscellaneous Cast in Place Concrete
 - 9. 25 50 00 Integrated Automation [pertinent to gate operator access control]
 - 10. 26 01 02 Electrical distribution [relating to gate operators]
 - 11. 31 22 19 Finish Grading

1.3 REFERENCES [Delete references not included in specification]

- A. ASTM A121 Specification for Metallic-Coated Carbon Steel Barbed Wire
- B. ASTM A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric
- C. ASTM A491 Specification for Aluminum-Coated Steel Chain-Link Fabric

- D. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- E. ASTM A817 Specification for Metallic-Coated Steel Wire for Chain Link Fence Fabric and Marcellled Tension Wire
- F. ASTM A824 Specification for Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link
- G. ASTM F552 Standard Terminology Relating to Chain Link Fencing
- H. ASTM F567 Standard Practice for Installation of Chain Link Fence
- I. ASTM F626 Specification for Fence Fittings
- J. ASTM F668 Specification for Polymer Coated Chain Link Fence Fabric
- K. ASTM F900 Specification for Industrial and Commercial Swing Gates
- L. ASTM F934 Specification for Standard Colors for Polymer-Coated Chain Link
- M. ASTM F1043 Specification for Strength and Protective Coatings of Steel Industrial Chain Link Fence Framework
- N. ASTM F1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
- O. ASTM F1184 Specification for Industrial and Commercial Horizontal Slide Gates
- P. ASTM F1345 Specification for Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Chain-Link Fence Fabric
- Q. ASTM F1664 Specification for Poly (Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used with Chain-Link Fence
- R. ASTM F1665 Specification for Poly (Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used with Chain-Link Fence
- S. ASTM F1910 Specification for Long Barbed Tape Obstacles
- T. ASTM F1911 Standard Practice for Installation of Barbed Tape
- U. ASTM F2200 Specification for Automated Vehicular Gate Construction
- V. UL325 Automatic operators: Door, Drapery, Gate, Louver and Window

1.4 SUBMITTALS [Delete referenced Master Format Sections if not applicable]

- A. Shop drawings: Site plan showing layout of fence location with dimensions, location of gates and opening size, cleared area, elevation of fence, gates, footings and details of attachments. Comply with the provisions of Section 01 33 23.
- B. Certifications: Manufacturers material certifications in compliance with the current ASTM specifications; comply with the provisions of Section 01 33 13.
- C. Domestic certifications: Material certifications, Made in U.S.A., Buy American Act or Buy America when required, follow the provisions of Section 01 33 13.
- D. Material samples: [Delete when not required] Provide representative samples of chain link fabric, framework and fittings. <Specify size and number of samples>
- E. Specification Changes: May not be made after the date of bid.

1.5 QUALITY ASSURANCE [Delete referenced MasterFormat Sections if not applicable]

- A. Manufacturer: Company headquartered in the United States having U.S. manufacturing facility/facilities specializing in manufacturing chain link fence products with at least 5 years experience; comply with Section 01 43 13.
- 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 in accordance with the provisions of Section 01 43 23.
- C. Tolerances: Current published edition of ASTM specifications tolerances apply. ASTM specification tolerances supersede any conflicting tolerance.

1.6 DELIVERY, STORAGE AND HANDLING [Delete when not applicable]

- A. Delivery: Deliver products to site per the requirements of Section 01 65 00.
- B. Storage: Store and protect products off the ground when required, Section 01 66 00

PART 2 – PRODUCTS

1.1.MANUFACTURERS

- A. Framework, posts, rails, pipe for gate frames:

- 1. Wheatland Tube Co. 800 343 0124 e-mail: fence@wheatland.com
www.wheatland.com

1.2.CHAIN LINK FABRIC

- A.** Steel Chain Link Fabric: [Height or heights indicated on drawings] [Select from table below and insert ASTM serial designation, mesh size, wire gauge, coating, including class and color when applicable, top/bottom selvage] [Delete specifications not applicable]

Example: Zinc-Coated ASTM A292 2 in. 9 ga. 1.2 oz/ft² (366 g/m²)

hot dipped galvanized chain link fabric having a twist selvage at top, knuckle selvage at bottom

1. Zinc-Coated Steel Fabric: ASTM A392 hot dipped galvanized before or after weaving.
 - a. Class 1 - 1.2 oz/ft² (366 g/m²)
 - b. Class 2 - 2.0 oz/ft² (610 g/m²) <available 9 and 6 gauge>
2. Aluminum-Coated Steel Fabric (Aluminized): ASTM A491
3. Zinc-5% Aluminum-Mischmetal Alloy Coated Steel Fabric: ASTM F1345
 - a. Class 1 – 0.6 oz/ft² (183 g/m²)
 - b. Class 2 – 1.0 oz/ft² (305 g/m²)
4. Polymer Coated Steel Fabric: ASTM F668, wire gauge specified 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: [dark green] [olive green] [brown] [black] in compliance with ASTM F934

5. Fabric Selection Table: Steel chain link mesh sizes and gauges produced in one-piece widths 3 feet (910 mm) to 12 feet (3660 mm) [Delete table after fabric selection]

Mesh Size	6 gauge	9 gauge	11 gauge	11 1/2 gauge	12 gauge	Notes

In.	0.192 in.	0.148 in.	0.120 in.	0.113 in.	0.105 in.	
mm	4.88 mm	3.76 mm	3.05 mm	2.87 mm	2.67 mm	N/A = Not applicable for
2 (50)	yes	yes	yes	N/A	N/A	industrial/ commercial
1 ¾ (44)	yes	yes	yes	N/A	N/A	
1 (25)	N/M	yes	yes	N/A	N/A	N/M = Not mfg.
5/8 (16)	N/M	yes	yes	yes	yes*	*12 ga. only per F668
1/2 (13)	N/M	yes	yes	yes	yes*	
3/8 (10)	N/M	N/M	yes	yes	yes*	
	2170 lbf	1290 lbf	850 lbf	750 lbf	650 lbf	Wire Break Strength
	(9650 N)	(5740 N)	(3780 N)	(3340 N)	(2895 N)	

6. Fabric selvage: [\[Enter fabric selvage above, delete text \]](#)

Standard fabric selvage for 2 in (50 mm) mesh 72 in. (1.8 m) high and higher is knuckle finish at one end, twist at the other, **[K&T]**. < **Specify K&K for added safety for play and park applications**>

Fabric less than 72 in (1.8 m), knuckle finish top and bottom, K&K.
[Manufacturing and installation issues dictate all mesh sizes less than 2 in. (50 mm) have a knuckle selvage for both top and bottom, K&K.]

2.3 ROUND STEEL PIPE FENCE FRAMEWORK

[\[Select post specification in A or B, delete specification or section of specification not selected, enter post information listed in 1 thru 3, delete Table C when completed\]](#)

- A. Round steel pipe and rail: Schedule 40 standard weight pipe, in accordance with ASTM F1083, 1.8 oz/ ft² (550 g/m²) hot dip galvanized zinc exterior and 1.8 oz/ft² (550 g/m²) hot dip galvanized zinc interior coating.

Regular Grade: Minimum steel yield strength 30,000 psi (205 MPa)
 High Strength Grade: Minimum yield strength 50,000 psi (344 MPa)
 [Specify Grade: Regular or High Strength] [4.000 in. OD not available in High Strength Grade]

[Specify 2.0 oz/ft² (610 g/m²) zinc coating for added corrosion protection or when specifying ASTM A392 Class 2, 2.0 oz/ft² zinc coated chain link fabric]

1. Line post <Insert outside diameter, weight lb/ ft. >
 2. End, Corner, Pull post <Insert outside diameter, weight lb/ft.>
 3. Top, brace, bottom and intermediate rails, 1.660 in. (42.2 mm) OD 2.27 lb/ft. (4.0 kg/m) [Delete top or bottom rails when not required and add tension wire per section 2.4, terminal post brace rails are required on fences six feet or higher]
- [Very rare to require larger than 1.660 in. OD rails other than some high security applications having 1.900 in. bottom rail]

B. Round steel pipe and rail: Cold-rolled electric-resistance welded pipe in accordance with ASTM F1043 Materials Design Group IC, WT-40 pipe, minimum steel yield strength 50,000 psi (344 MPa). Type B external coating, hot dip galvanized zinc 1.0 oz/ ft² (305 g/m²) with a clear polymeric overcoat, Type D interior 90% zinc-rich coating having a minimum thickness of 0.30 mils (0.0076 mm).

1. Line post <Insert outside diameter, weight lb/ft>
2. End, Corner, Pull post < Insert outside diameter, weight lb/ft>
3. Top, brace, bottom and intermediate rails, 1.660 in. (42.2 mm) OD 2.28 lb/ft (3.39 kg/m) [Delete top or bottom rails when not required and add tension wire, terminal post brace rails are required on fences six feet or higher]

[Very rare to require larger than 1.660 in. OD rails other than some high security applications having 1.900 in. bottom rail]

C. Typical post and rail size for normal industrial/commercial applications

Item	Fence Height	Outside Diameter Inches (mm)	*F1083 Schedule 40 Weight lb/ft (kg/m)	F1043-IC WT-40 Weight lb/ft (kg/m)

Line post	up to 6 ft. (1.8 m)	1.900 (48.3)	2.72 (4.0)	2.28 (3.39)
	over 6 to 8 ft. (1.8 to 2.4 m)	2.375 (60.3)	3.65 (5.4)	3.12 (4.64)
	over 8 to 12 ft. (2.4 to 3.7 m)	2.875 (73.0)	5.79 (8.6)	4.64 (6.91)
	over 12 to 16 ft. (3.7 to 4.9 m)	4.00 (101.6)	9.11 (13.6)	6.56 (9.78)
Terminal post	up to 6 ft. (1.8 m)	2.375 (60.3)	3.65 (5.4)	3.12 (4.64)
	over 6 to 8 ft. (1.8 to 2.4 m)	2.875 (73.0)	5.79 (8.6)	4.64 (6.91)
	over 8 to 12 ft. 2.4 to 3.7 m)	4.000 (101.6)	9.11 (13.6)	6.56 (9.78)
	over 12 to 16 ft. (3.7 to 4.9 m)	6.625 (168.3)	18.97 (28.2)	Not available
		8.625 (219.1)	28.58 (42.5)	Not available
Rails		1.660 (42.2)	2.27 (3.4)	1.84 (2.74)

*Regular Grade F1083 Schedule 40

[When project requires color polymer coated framework select coating type and color, if not delete this paragraph]

D. Polymer Coated Pipe: Polymer coated pipe shall have a [PVC or Polyolefin] [Polyester] coating fused and adhered to the exterior zinc coating of the galvanized pipe in accordance with ASTM F1043. The minimum thickness of the PVC or Polyolefin coating shall be 10-mils (0.254 mm), for polyester 3 mils (0.0076 mm). Color to match fabric [dark green] [olive green] [brown] [black] per ASTM F934.

Framework Wind Load Caution: [Delete as applicable]

Fences containing windscreens or privacy slats and fences greater than 8 feet (2.4 m) in height using, 1 in. (25 mm) mesh or smaller require a wind load

force analysis for post selection and post spacing. An interactive Wind load Fence Post Calculator for selection of size and spacing of line posts is available at www.wheatland.com]

2.4 TENSION WIRE [Include tension wire at top and bottom of fence when top or bottom rail are not specified] [Delete paragraph A or B as applicable]

A. Metallic Coated Steel Marcellled Tension Wire: 7 gauge (0.177 in.) (4.50 mm) marcellled wire complying with ASTM A824

[Match coating type to that of the chain link fabric]

1. Type I Aluminum-Coated (Aluminized) 0.40 oz/ft² (122 g/m²) Type II

2. Zinc-Coated, ASTM A817 Class 4 - 1.2 oz/ft² (366 g/m²)

3. Type II Zinc-Coated, ASTM A817 Class 5 - 2.0 oz/ft² (610 g/m²)

B. 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] <Insert material coating class and color>

1. Class 1, extruded

2. Class 2a, extruded and adhered

3. Class 2b, fused and adhered,

2.5 BARBED WIRE [Delete if not required, drawings should indicate barbed wire, three strands of six strands on V-barb arms]

A. Metallic Coated Steel Barbed Wire: Comply with ASTM A121, Design Number 12-4-5-14R, double 12-½ gauge (0.099 in.) (2.51 mm) twisted strand wire, with 4 point 14 gauge (0.080 in.) (2.03 mm) round barbs spaced 5 inches (127 mm) on center. Match coating type to that of the chain link fabric. <12-4-5-14R is specifically designed for chain link fence applications> <Insert material coating specification including type and class when applicable>

<12-4-5-14R is specifically designed for chain link fence applications> <Insert material coating specification including type and class when applicable>

1. Coating Type A - Aluminum-Coated (Aluminized): Strand wire coating Type A - 0.30 oz/ft² (90 g/m²) with aluminum alloy barbs.

2. Coating Type Z - Zinc-coated: Strand wire coating Type Z, Class 3, 0.80 oz/ft² (254 g/m²), barb coating 0.70 oz/ft² (215g/m²)

B. Polymer Coated Barbed Wire: Comply with ASTM F1665, 14 gauge (0.80 in) (2.03 mm) double twisted galvanized steel strand core wire; zinc coated steel or aluminum alloy four point, 14 gauge (0.080 in.) (2.03 mm) barbs spaced 5 inches (127 mm) on center <Match strand wire coating class and color to the chain link fabric> <Barbs are not polymer coated> <Insert strand wire class coating and color>

1. Class 1, extruded

2. Class 2a, extruded and adhered

3. Class 2b fused and adhered.

1.6. BARBED TAPE [Delete if not required]

Stainless Steel Long Barbed Tape: Comply with ASTM F1910. <based on the security level select the design configuration from the ASTM F1910 tables>
< Insert description, barbed tape material, coil diameter, core wire gauge and material when applicable; barb clusters per loop, coil loops, coil loop spacing, coil length, attachment points>

1.7.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). Secure bands with 5/16 in. (7.94 mm) galvanized steel carriage bolts.
- 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). [Select required tension bar, delete remainder of section] [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)] [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)] [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 bolted thru the strap the mesh and thru the terminal post.]
- E. Barbed Wire Arms: [Delete if not required. When required select three strand or six strand] In compliance with ASTM F626, pressed steel galvanized after fabrication, minimum zinc coating of 1.20 oz. /ft² (366 g/m²), capable of supporting a vertical 250 lb (113 kg) load. [Type I – three strand 45 degree (0.785 rad) arm] [Type II – three strand vertical arm] [Type III – “V” shaped six strand arm]
- F. [Polymer Coated Color Fittings: [Delete if not required] In compliance with ASTM F626, PVC or Polyolefin coating minimum thickness 0.006 in. (0.152 mm) fused and adhered to the zinc coated fittings] [Match color to fence system]

1.8.TIE WIRE and HOG RINGS [Select as required, delete remainder]

<Basic industrial applications specify 9 gauge aluminum alloy ties and hog rings per ASTM F626> <Added security or fences containing privacy slats specify 9 gauge (0.148) (3.76 mm) steel galvanized preformed power fastened wire ties and preformed hog rings having minimum zinc coating 1.20 oz/ft² (366 g/m²) per ASTM F626> <polymer coated, match the coating, class and color to that of the chain link fabric>

2.9 SWING GATES [Delete if not required, specify gate opening and if double or single leaf if not shown on drawings]

- A. Swing Gates: Galvanized steel pipe welded fabrication in compliance with ASTM F900. Gate frame members 1.900 in. OD (48.3 mm) <Insert pipe specification> [ASTM F 1083 schedule 40 galvanized steel pipe] [ASTM F1043 Group IC WT 40 galvanized steel 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, pressed steel galvanized after fabrication. Galvanized malleable iron or heavy gauge pressed steel post and frame hinges. Provide lockable drop bar and gate holdbacks with double gates. Match gate fabric to that of the fence system. Gateposts per ASTM F1083 schedule 40 galvanized steel pipe. <Select the gatepost diameter from table 2.9 B> <Insert diameter and weight> <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> <electrically operated gates must comply with ASTM F2200 and UL325>**

- B. Gateposts: Regular Grade ASTM F1083 Schedule 40 pipe [Consider leaving table in standard, it is not unusual for gate sizes to be changed as project progresses]**

Gate fabric height up to and including 6 ft. (1.2m)		
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)

2.10 HORIZONTAL SLIDE GATES [\[Select that required, specify double or single, height and width, delete remainder of section\]](#)

- A. Type I-Overhead Slide Gates: In compliance with ASTM F1184 Type I. Gate framing to be of welded construction, minimum 1.900 in. OD (48.3 mm) galvanized pipe members. **<Insert pipe specifications>.** **[ASTM F1083 schedule 40 pipe]** **[ASTM F1043 Group IC WT 40 pipe]** Framing members to be spaced no more than 8 ft. (2440 mm) apart horizontally and vertically. Welded joints are to be protected by applying zinc-rich paint in accordance with ASTM Practice A780. Positive locking latch, pressed steel, galvanized after fabrication. Galvanized steel drop bars to be provided with double gates. Chain link fabric to match the fence system. Manufacturer's standard overhead beam/structure, track, rollers and accessories designed to support the load of the gate panel taking into consideration wind load and possible icing. The support beam/structure to be galvanized or receive proper corrosion protection. Gateposts in compliance with ASTM F1083 Schedule 40 galvanized steel pipe **<Insert diameter >.**
[Post size for gate openings up to and including 10 ft. (3.05 m) shall be 2.875 in OD (73 mm),
Openings greater than 10 ft. (3.05 m) up to 24 ft. (7.3 m) 4.000 in. OD (101.6 mm),
Openings greater than 24 ft. (7.3 m) up to 40 ft. (12.2 m) double 4.000 in. OD (101.6 mm) posts]

- B. Cantilever Slide Gates: In compliance with ASTM F1184 Type II

1. Class 1-External Roller Design: Horizontal top and bottom steel pipe "track" members to be 2.375 in. OD (60.3 mm). Vertical and internal

members, 1.900 in. O.D. in compliance with **<Inset gate pipe frame specification> [ASTM F1083 schedule 40 galvanized steel pipe] [ASTM F1043 Group IC WT 40 galvanized steel pipe.]** Gate frame to be fabricated by welding, vertical and horizontal members installed no greater than 8 ft. (2440 mm) apart. Welded joints are to be protected by applying zinc-rich paint in accordance with ASTM Practice A780. Gates designed to open or close by applying an initial pull force no greater 40 lbs. (18.14 kg). Match chain link fabric to that of the fence system. Positive locking pressed steel latch, galvanized after fabrication. Galvanized steel drop bars provided with double gates. Gateposts, 4.000 in. OD (101.6 mm) schedule 40 pipe per ASTM F1083. Provide safety protective guards for the top and bottom external rollers following ASTM F1184 guidelines.

2. Class 2-Internal Roller Design: **<Indicate material and design>** Gate frame fabricated by welding, vertical and horizontal members installed no greater than 8 ft. (2440 mm) apart. Class 2 cantilever slide gates to comply with the performance deflection criteria listed in ASTM F1184. Gates designed to open or close by applying an initial pull force no greater than 40 lbs. (18.14 kg). Internal truck assemblies designed to handle the forces required for gate size opening and height. Match chain link fabric to that of the fence system. Gateposts, 4.000 in. O.D. (106.1 mm) schedule 40 pipe per ASTM F1083. **<Internal roller cantilever designs vary by manufacturer and material>**

- a. **[Steel Pipe Frame Design: Match the specification of Class 1 cantilever slide gate. Securely bolt an extruded aluminum enclosed track to the top horizontal member that is designed to accommodate internal roller assemblies.]**
- b. **[Aluminum Frame Design: Aluminum rectangular members of various shapes and wall thickness per manufacturers designed for gate opening and height. Top horizontal member to be one-piece extruded section having an integral internal track to accommodate truck assemblies.]**

C. **[Polymer coated horizontal slide gates and posts shall match the coating type and color as that specified for the fence framework.] <Insert coating requirement and color>**

D. Electrically operated horizontal slide gates must be manufactured and installed to comply with the safety requirements of ASTM F2200 and UL 325 **[Delete if not required]**

2.11 CONCRETE **[Revise if project requires alternate mix]**

Concrete for post footings shall have a 28-day compressive strength of 2,500 psi. (17.2 MPa).

PART 3 EXECUTION

1.1. 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 **<Insert project requirement> [is included in the earthwork contractor's contract under the provisions of Division 31 - Earthwork.] [is not included in the earthwork contractor's contract and is the responsibility of the fence contractor in accordance with the provisions of Division 31 - Earthwork.]** The contract drawings indicate the extent of the area to be cleared and grubbed.

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 mm) depth 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 a 4.00" (101.6 mm) dimension and three times the largest cross section of post greater than a 4.00" (101.6 mm) dimension. **<Insert footing depth and diameter> <Site soil conditions, local frost depth, fence height and wind load may require larger diameter or deeper footings>** Top of concrete footing to be **[at grade] [6 inches (152 mm) below grade]** **<Insert footing grade requirement>** 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 the line post or barb arm loop top. Splice rail using top rail sleeves minimum 6 in. (152 mm) long. 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 clamps or brace band with rail end. **<Fences 12 feet (3.66 m) high or higher require mid rail>**
- 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 each line post with a tie wire. **<Install the**

top tension wire through the barb arm loop for fences having barbed wire and no top rail.>

1.3.CHAIN LINK FABRIC INSTALLATION

Chain Link Fabric: Install fabric to **[outside] [inside]** of the framework maintaining a ground clearance of no more than 2 inches (50 mm). 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) galvanized steel strap using carriage bolts, 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 horizontal rail spaced no greater than 18 inches (457.2 mm) on center. **[Aluminum alloy tie wire shall be installed following ASTM F567: Wrap the tie around the post or rail and attached to a fabric wire picket on each side of the post or rail by twisting the tie wire around the fabric wire picket two full turns, cut off excess wire and bend over to prevent injury.] [Preformed 9 gauge power-fastened wire ties shall be installed following ASTM F567: Wrap the tie a full 360° around the post or rail and fabric wire picket, using a variable speed drill, twist the two ends together three full turns, cut off any excess wire and bend over to prevent injury.]** Secure the fabric to the tension wire by crimping hogs rings around a fabric wire picket and tension wire.

3.4 BARBED WIRE INSTALLATION [\[Delete when not required\]](#)

Barbed Wire: Stretched taut between terminal posts and secured in the slots provided on the line post barb arms. Attach each strand of barbed wire to the terminal post using a brace band. **<Indicate type of barb arm, Type I, II or III and direction [inward] [outward] for installation of Type I arm. >**

3.5 GATE INSTALLATION [\[Delete section or gate type when not required\]](#)

- A. Swing Gates: Installation of swing gates and gateposts in compliance with ASTM F 567. Direction of swing shall be **[inward.] [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 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.
- Electrically operated gates must be manufactured and installed in compliance with ASTM F2200 and UL 325.

- B. Horizontal Slide Gates: Installation varies by design and manufacturer, install according to manufacturers instructions and in accordance with ASTM F567. Gates shall be plum in the closed position, installed to slide with an initial pull force no greater than 40 lbs. (18.14 kg). Double gate drop bar receivers to be installed in a concrete footing minimum 6 in. (152 mm) diameter, 24 in. (609.6 mm) deep. Roller guards and guide posts must be installed on Type I external roller cantilever slide gate in compliance with ASTM F1184. Ground clearance shall be 3 in. (76 mm), grade permitting.
Electrically operated gate installation must conform to ASTM F2200 and UL 325.

3.6 BARBED TAPE INSTALLATION [\[Delete if not required\]](#)

Barbed Tape: Barbed tape when specified shall be installed in accordance with ASTM F1911.

1.7. 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.

1.8. ELECTRICAL GROUNDING

Grounding: Grounding of the fence and gates is not the responsibility of the fence contractor and not included in the fencing scope of work for this contract.
Grounding, when required, shall be specified and included in Contract Section 33 79 00 Site Grounding. A licensed electrical contractor shall install grounding when required.

1.9. 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

