



Standard Specifications for Selecting Chain Link Barrier Systems With Coated Chain Link Fence Fabric and Round Posts for Detention Applications¹

This standard is issued under the fixed designation F 1916; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification provides the recommended criteria for specifying the construction of barrier systems for restricting access or ensuring human confinement, with the capability of defeating or seriously resisting any breaching attempts.

1.2 No recommendation is made or implied as to the merits of the product of any particular manufacturer. Choice of product components selection for the barrier system should be made by the writers of the project based on their own perception of the merits of products for this application.

1.3 The values stated in inch-pound units are to be regarded as the standard. The SI values stated in parentheses are provided for information only.

2. Referenced Documents

2.1 *ASTM Standards:*

- A 121 Specification for Zinc-Coated (Galvanized) Steel Barbed Wire²
- A 123 Specification for Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products²
- A 153/A 153M Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware²
- A 176 Specification for Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip³
- A 392 Specification for Zinc-Coated Steel Chain Link Fence Fabric²
- A 478 Specification for Chromium-Nickel Stainless and Heat-Resisting Steel Weaving and Knitting Wire³
- A 491 Specification for Aluminum-Coated Steel Chain-Link Fence Fabric²
- A 585 Specification for Aluminum-Coated Steel Barbed Wire²
- A 666 Specification Annealed or Cold-Worked for Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar³
- A 780 Practice for Repair of Damaged and Uncoated Areas

- of Hot-Dip Galvanized Coatings²
- A 824 Specification for Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link Fence²
- B 117 Practice for Operating Salt Spray (Fog) Apparatus⁴
- C 94 Specification for Ready-Mixed Concrete⁵
- F 552 Terminology Relating to Chain-Link Fencing²
- F 567 Practice for Installation of Chain-Link Fence²
- F 626 Specification for Fence Fittings²
- F 668 Specification for Poly (Vinyl Chloride) (PVC)-Coated Steel Chain-Link Fence Fabric²
- F 900 Specification for Industrial and Commercial Swing Gates²
- F 934 Specification for Standard Colors for Polymer Coated Chain-Link Fence Materials²
- F 1043 Specification for Strength and Protective Coatings of Metal Industrial Chain-Link Fence Framework²
- F 1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures²
- F 1184 Specification for Industrial and Commercial Horizontal Slide Gates²
- F 1345 Specification for Zinc-5 Aluminum-Mischmetal Alloy-Coated Steel Chain-Link Fence Fabric²
- F 1379 Terminology Relating to Barbed Tape²
- F 1910 Specification for Long Barbed Tape Obstacles²
- F 1911 Practice for Installation of Barbed Tape²
- F 1664 Specification for Poly (Vinyl Chloride) (PVC)-Coated Steel Tension Wire Used With Chain-Link Fence²
- F 1665 Specification for Poly (Vinyl Chloride) (PVC) Coated Steel Barb Wire Used With Chain-Link Fence²
- 2.2 *Other Standards:*
 - NFPA No. 70—National Fire Protection Association
 - NEC National Electric Code
 - NESC National Electric Safety Code
 - ANSI No. C2 American National Standards Institute
 - CEGS 02831 (Corp of Engineers Guide Standard) Army Corp of Engineers Fencing Specification
 - AISI American Iron and Steel Institute
 - Uniform Building Code (Chapter 23 Section 2303 (d) Stress

¹ These specifications are under the jurisdiction of ASTM Committee F-33 on Detention and Correctional Facilities and are the direct responsibility of Subcommittee F33.02 on Physical Barriers.

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² *Annual Book of ASTM Standards*, Vol 01.06.

³ *Annual Book of ASTM Standards*, Vol 01.03.

⁴ *Annual Book of ASTM Standards*, Vol 03.02.

⁵ *Annual Book of ASTM Standards*, Vol 04.02.

Increase for Wind Load

3. Terminology

3.1 *Definitions*—See Terminology F 552 for definitions of terms relating to chain link fencing and Terminology F 1379 for terms relating to barbed tape.

4. Significance and Use

4.1 The user of this specification should select product components affording the degree of protection needed for various levels of security, and is encouraged to contact various producers of fence materials for advice in this respect.

4.2 This specification is not intended to define the minimum or maximum degree of protection needed, nor to guarantee that the resulting barrier system will resist or defeat any or all breaching attempts.

5. Submittals and Samples

5.1 Provide shop drawings, catalog cuts, and other submittals illustrating application of the material components to the project. Include installation instructions where applicable.

5.2 Prior to shipment, provide representative samples of material components as follows:

5.2.1 *Chain Link Fabric*, 12-in. (305-mm) square sample of each type and size.

5.2.2 *Barbed Wire*—12-in. (305-mm) length.

5.2.3 *Barbed Tape*, 12-in. (305-mm) length of each type. Barbed tape segment sample shall contain a minimum of three barbed clusters.

5.2.4 *Tension Wire*, 12-in. (305-mm) length.

5.2.5 *Posts and Horizontal Rails*, 12-in. (305-mm) length of each type and size.

5.2.6 *Post Top Extension Arms*, One of each type and size.

5.3 *Certification*—When specified in the purchase order or contract, the purchaser shall be furnished certification samples representing each lot have been either tested or inspected as directed in this specification and the requirements have been met. When specified in the purchase order or contract, a report of the test results shall be furnished.

5.4 *Contractor Experience*—Contractors shall show proof of experience for barbed tape installation.

5.5 *Warranty*—Provide warranty certificates within manufacturer’s guidelines.

6. Material

6.1 Select chain link fabric coating type from one of the following:

6.1.1 *Zinc*, coated in accordance with Specification A 392 Class 2 coating.

6.1.2 *Aluminum*, coated before weaving in accordance with Specification A 491.

6.1.3 *Zinc-5 % Aluminum-Mischmetal Alloy-Coated*, in accordance with Specification F 1345, Class 2 coating.

6.1.4 *Poly (Vinyl Chloride) (PVC) Coated Steel*, in accordance with Specification F 668, Class 2b.

6.1.5 If PVC-coated fabric is selected, select Class 2a or 2b coating, and type of metallic coating on core wire from Specification F 668. Select color from Specification F 934.

6.1.6 Select fabric mesh, wire diameter, height, and type of top and bottom salvage from Specifications A 392, A 491 or F 668, and F 1345.

6.1.7 *Performance*—For historical data on actual atmospheric corrosion performance of aluminum-coated and zinc-coated chain link fabric from 1961 to 1993 at seven test sites within the United States, refer to Data Series 65.⁶

NOTE 1—6-gage, 0.192-in. (4.88-mm) diameter metallic coated wire is recommended for security applications where cutting through is a threat. Smaller mesh sizes with reduced wire diameters near the top of the fence also are recommended to thwart climbing where limited amounts of barbed tape are used.

NOTE 2—Fence fabric hot-dipped zinc-coated (galvanized), after weaving, in accordance with Specification A 392, Class-2, should not be specified when fence sensors are an integral part of the perimeter fence. Only zinc pre-coated fence fabric, aluminum coated, or zinc-5 % aluminum-mischmetal, should be specified in conjunction with fence sensors.

NOTE 3—Testing data from the ASTM thirty-two year report does not include zinc-5 % aluminum-mischmetal alloy coated steel wire before weaving. This product was not in production when the atmospheric corrosion investigation began for aluminum-coated and zinc-coated steel products, however, both the aluminum-coated and zinc-5 % aluminum-mischmetal alloy have demonstrated the ability to withstand 1000 h of salt spray to a maximum of 5 % red rust when tested in accordance with Test Method B 117.

6.2 *Framework*—Posts, rails, and braces shall conform to strength requirements of Specification F 1083 and Specification F 1043, Group IA, IC. Coating requirements shall also conform to Specification F 1083 and Specification F 1043. Select post and rail sizes from Tables 1-5.

NOTE 4—If fabric with mesh size smaller than 2 in. is selected, consideration shall be given to the additional wind, snow, or ice loads placed upon the fence. Post sizes shall be increased or the post spacing decreased accordingly. Post spacing, size, and type of post shall be calculated by the local authority having jurisdiction. For additional wind load information, in normal soil conditions, see Appendix X1.

6.2.1 Uniform Building Code, Chapter 23, Section 2303(d) Stress Increases states that all allowable stresses and soil-bearing values specified in this code for working stress design, may be increased one-third when considering wind or earthquake forces either acting alone or when combined with vertical loads. No increase will be allowed for vertical loads acting alone.

⁶ Data Series 65, *Atmospheric Corrosion Investigation of Aluminum-Coated, Zinc-Coated and Copper-Bearing Steel Wire and Wire Products, a Thirty-Two Year Report*, PCN 05-15950-02 available from ASTM Headquarters.

TABLE 1 Terminal Post Sizes

Fabric Height in ft	Nominal size, in.		Wall Thickness, in.		Wt/Ft lbs	
	IA ^A	IC ^A	IA ^A	IC ^A	IA ^A	IC ^A
Grade						
≤ 6	2 ½	2.375	.154	.130	3.65	3.12
7–8	2 7/8	2.875	.154	.160	5.79	4.64
9–12	3 ½	3.500	.216	.160	7.58	5.71
13–16	4	4.0	.226	.160	9.11	6.56
17–18	6 5/8	6.625	.280		18.99	
19–20	8 5/8	8.625	.322		28.55	

^AIA and IC refers to post conforming to Specification F 1043.

TABLE 2 Rail Sizes

Rails Grade	Nominal Size		O.D. in.		Wall Thickness		Wt/Ft/lbs	
	IA ^A	IC ^A	IA ^A	IC ^A	IA ^A	IC ^A	IA ^A	IC ^A
Size	1-5/8		1.660		.140 .110		2.27 1.82	

^AIA and IC refers to post conforming to Specification F 1043.

TABLE 3 Line Post Sizes

Fabric Height ft	Nominal size, in.		O.D., in.		Wall Thickness, in.		Wt/Ft, lbs
	IA ^A	IC ^A	IA ^A	IC ^A	IA ^A	IC ^A	
Grade	IA ^A	IC ^A	IA ^A	IC ^A	IA ^A	IC ^A	IC ^A
≤ 6	1 7/8	1.90	.145	.120	2.72	2.28	
7–10	2 3/8	2.375	.154	.130	3.65	3.12	
11–16	2 7/8	2.875	.203	.160	5.79	4.64	
17–18	3 1/2	3.500	.216	.160	7.58	5.71	
19–20	4.0	4.0	.226	.160	9.11	6.56	

^AIA and IC refers to post conforming to Specification F 1043.

TABLE 4 Gate Post Sizes

Gate Height, ft	Gate Width					
	6 ft	8 ft	10 ft	12 ft	14 ft	16 ft
≤ 8	2.875	3.5	3.5	3.5	4.0	6.625
9–10	3.5	3.5	4.0	4.0	6.625	6.625
11–12	4.0	4.0	4.0	6.625	8.625	8.625
13–14	4.0	4.0	6.625	6.625	8.625	8.625
15–16	4.0	4.0	6.625	6.625	8.625	8.625
17–18	6.625	6.625	8.625	8.625	8.625	
19–20	6.625	8.625	8.625	8.625		

TABLE 5 Post Hole Depths^A

Exposed Height of Fabric	Line Post, in.	Corner/End Pull Post, in.	Setting Depth, in.
6 ft	1.90	2.375	30 in.
7 ft	2.375	2.875	33 in.
8 ft	2.375	2.875	36 in.
9 ft	2.875	4.0	39 in.
10 ft	2.875	4.0	42 in.
11 ft	2.875	4.0	45 in.
12 ft	2.875	4.0	48 in.
13 ft	2.875	4.0	51 in.
14 ft	3.5	4.0	54 in.
15 ft	3.5	4.0	57 in.
16 ft	4.0	6.525	60 in.

^AThe depth shall be a minimum of 24 in. plus an additional 3 in. for each 1-ft increase in the fence height over 4 ft.

6.2.1.1 *Group IA*—Posts, rails, and braces shall conform to the strength and coating requirements of Specification F 1083 and F 1043.

6.2.1.2 *Group IC*—Posts, rails, and braces shall conform to strength and coating requirements of Specification F 1043, Type A-A, Type B-B, Type B-D, and Type B-C.

6.2.2 *Performance*—The product of the yield strength and section modulus shall not be less than that for post conforming to Specification F 1083.

6.3 Tension wire shall be in accordance with Specification A 824, Type I or Type II, Class 3 coating. Where specified, tension wire used in place of rails, or to support barbed tape shall be 0.177-in., (4.50 mm) ± 0.005 in. (0.13 mm) minimum diameter. PVC-coated steel tension wire shall be in accordance with Specification F 1664.

6.3.1 *Performance*—See 6.1.7.

NOTE 5—Top tension wire shall always be used if the fence has no top

rail. Bottom tension wire is not recommended for detention or correctional applications.

6.4 Barbed wire shall be in accordance with Specification A 121, Chain-Link Fence Grade, except that barb spacing shall be a maximum of 3 in. (76 mm), or in accordance with Specification A 585, Type II with 3 in. (76 mm) maximum barb spacing. PVC-coated steel barbed wire shall be in accordance with Specification F 1665.

6.4.1 *Performance*—See 6.1.7.

6.5 Barbed tape shall be of the type specified in accordance with Specification F 1910 fabricated from stainless steel conforming to Specification A 176 and A 666.

6.5.1 Tie wire for securing barbed tape shall be a minimum of 16-gage stainless steel.

6.5.2 Wire ring (hog rings) for securing barbed tape shall be a minimum of 12-1/2-gage stainless steel, depending on the application.

6.6 Fittings are to be in accordance with Specification F 626 except as modified herein. Miscellaneous hardware coatings shall conform to Specification A 153/A 153M, unless as modified herein.

6.6.1 *Tie Wire Options for Securing Chain-Link Fabric to Framework:*

6.6.1.1 *Option 1*—Tie wires shall be 9-gage steel 0.148 in. ± 0.005 in. (3.76 ± 0.13 mm) with tensile strength ranging from dead soft to ksi (517 MPa).

6.6.1.2 *Option 2*, 6-gage steel 0.192 ± 0.005 in. (4.88 ± 0.13 mm) with tensile strength, dead soft.

6.6.1.3 *Option 3*, 304 stainless steel wire, 9-gage only, cold-drawn annealed, dead soft.

6.6.1.4 *Performance*—See 6.1.7.

6.6.2 *Tie Wire Coating Options:*

6.6.2.1 *Option 1*, zinc-coating, 9-gage steel wire, 1.8 oz/ft² (549 g/m²).

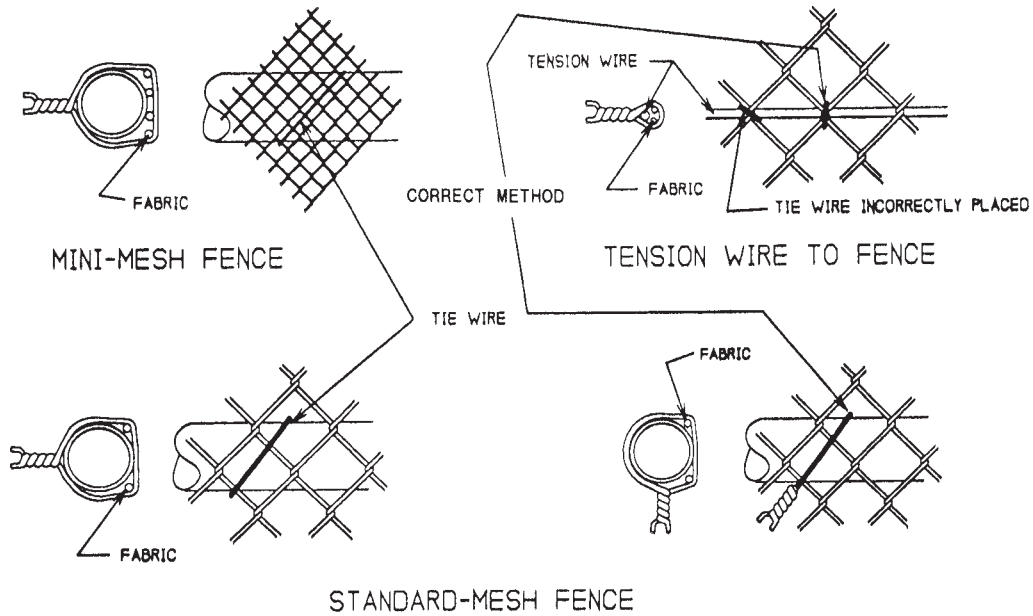
6.6.2.2 *Option 2*, zinc-coating, 6-gage steel wire, 2.0 oz/ft² (600 g/m²).

6.6.2.3 *Option 3*, aluminum coating 9- and 6-gage, 0.40 oz/ft² (122 g/m²).

6.6.2.4 *Option 4*, PVC-coating in accordance with Specification F 668, Class 2B, color to match fabric.

6.6.3 *Wire Rings (Hog Rings) or Tension Wire Tires*—Hog rings or wire ties used for securing chain link fabric to tension wires shall match the fabric coating selected. Wire diameter shall be 0.148 ± 0.005 in. (3.76 ± 0.13 mm). Where electronic detection is an integral part of the fence system, twistable wire tires are recommended in place of hog rings (see Fig. 1).

6.6.3.1 *Round Metallic-Coated Steel Tie Wires and Hog Rings*, shall withstand all forming or twisting operations without cracking or flaking of the coating to such an extent that any zinc or aluminum can be removed by rubbing with bare fingers. When specified, round metallic-coated tie wires and hog rings shall be polymer-coated to match the color of the chain link fabric, as selected from Specification F 934. The coating process and metallic-coating core wire material shall be as specified in Specification F 668. The tensile strength of the core wire constituting the tie wires and hog rings shall be suitable to accommodate a manual or power fastening process without causing damage to the metallic or polymer coating.



ORIGINAL TIE GENERAL SHAPE	TIE SHAPE AS TWISTED ON POST	TIE WITH TAILS REMOVED	MINI-MESH WIRE TIE	TENSION WIRE TIE	STANDARD-MESH WIRE TIE	STANDARD-MESH WIRE TIE ON SIDE

FIG. 1 Chain Link and Tension Wire Twist Tie Options

6.7 Gates, single and double swing gate panels shall conform to Specification F 900. The welded gate frame shall be constructed from 1.90 in. (48.3 mm) minimum o.d. pipe. Steel pipe conforming to Specification F 1043 Group IA or IC, shall be coated in accordance with Specification F 1083 or F 1043. Welded joints shall be coated in accordance with repair Practice A 780. Filler fabric fitting and tie wires shall conform to the specification.

6.7.1 Swing Gate Hinges, shall be malleable iron 180° hinge ball and socket type. All threaded ends of bolts shall be tack welded or peened.

6.7.2 Single Swing Gate Latches, shall be malleable iron gravity latch type. The latch pin shall be welded into the gate panel. Gate post receiver bolts shall be tack welded or peened.

6.7.3 Swing Gate Locks, may be furnished in lieu of swing gate latches. Consult with correctional lock manufacturer for lock specification information.

6.7.4 Double Swing Gate Latch, shall meet the requirements of Specification F 900. For gate heights 14 ft (4.3 m) and higher, provide a locking device attached to the transom, that will prevent gate leaves from being forced open.

6.8 Cantilever Sliding Gates, when specified shall be furnished for fence heights of 96 in. (2440 mm) and lower. Cantilever sliding gates shall meet the requirements of Specification F 1184, Type 2 aluminum frame gates using internal rollers. Filler fabric shall meet the chain-link fence specifications.

6.9 *Vehicle Overhead Sliding Gate Frame*, shall be capable of withstanding a minimum gate panel weight of 3000 lb (1361 kg). Consult with correctional gate manufacturer for overhead beam, trolley and gate/door panel design assistance.

6.10 *Vehicle Sallyport Heavy—Duty Overhead Electrical Gate Operators*, or vertical lift gate systems may be utilized. Consult with correctional gate manufacturer for detailed operator specifications and security locking device information.

7. Installation

7.1 *Site Preparation (shall be by others)*—Prior to fence erection, all necessary grading and cleaning on both sides of fence line shall be done in such a manner as to provide a straight, flat surface. There shall be no gaps greater than 2 in. (50 mm) between the bottom of the fence and finished grade or grade beam. All finished grade, dirt fill shall be thoroughly compacted.

7.2 Erect fence in accordance with Practice F 567, except as modified herein.

7.3 Erect the fence in straight lines between angle points. Only two posts may be out of alignment at the base, a maximum of 2 in. (50 mm) in any 200-ft (60-m) run. All chain-link fence components shall be grounded as shown on the drawing and as specified in 7.25

7.4 *Post Hole Diameters*, minimum of 10-in. (254-mm) for 2.375-in. (60-mm) posts, 12-in. (305-mm) for 2.875-in. (73-mm) posts, 16-in. (406-mm) for 4-in. (102-mm) posts, 24-in. (610-mm) for 6.625-in. (168-mm) posts, and 32-in. (813-mm) for 8.625-in. (219-mm) posts.

NOTE 6—Intended use and soil condition shall determine post footing dimensions. Dimensions recommended within this specification are for normal soil conditions (see Practice F 567).

7.5 *Post Hole Depths*, see Table 5.

7.6 *Concrete Mix*, in accordance with Specification C 94 having a maximum stone aggregate of $\frac{3}{4}$ in. (10 mm), and a minimum compressive strength of 2.5 ksi (17.2 MPa) in 28 days. Thoroughly work the concrete mix into the post holes so as to leave no voids. Allow concrete to cure a minimum of seven days before erecting the rails and fabric. Trowel the concrete to a crown finish at the top to shed water.

NOTE 7—The use of sleeves preinstalled in new concrete is recommended as an alternative method, when posts are unusually shaped or conditions within the contract specify other extraordinary circumstances.

7.7 *Post Holes in Solid Rock or Concrete*—Drill holes into solid rock or concrete $\frac{1}{2}$ in. (25 mm) larger than post diameter, 18 in. (457 mm) deep for end, pull, corner, and gate posts, and 12 in. (305 mm) deep for line posts. Half fill the void with nonshrinkable grout and force the post to the bottom of the hole so as to leave no voids. Crown the grout to shed water (see Practice F 567).

7.8 *Post Spacing*—Space posts equal distance in the fence line to a maximum of 10 ft (3.05 m) on center.

7.9 *Post and Rail Spacing*, some types of electronic detection systems require additional support. In such cases fences 10 to 14 ft (3 to 4.2 m) in height, the unsupported area of lower panel shall not exceed 60 ft² (4.65 m²). For example, if the fence height is 10 ft (3.05 m) and post spacings are 10 ft (3.05 m), the fence must have a top, intermediate, and bottom rail.

The intermediate shall be placed 6 ft (1.8 m) above the bottom rail. If the fence heights are 15 ft (4.57 m) and greater and post spacings are 8 ft (2.44 m), the fence must have a top rail, intermediate rail, and bottom rail. The intermediate rail shall be placed 7.5 ft (2.29 m) above the bottom rail. Consult with the electronic system's manufacturer for additional information regarding their system.

7.10 *Terminal Posts*—Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Terminal posts are used at the beginning and end of each continuous length of fence, or for changes in direction of 15° or more, and for any abrupt change in grade. Pull posts are located at intervals not greater than 500 ft (152 m). For runs over 500 ft (152 m), space pull posts equal distance between corner or end posts. On long curves, space terminal posts so that the strain of the fence will not bend the line posts. Bracing for corner and pull posts shall be in both directions. Brace rails shall be of the same material as specified for the other horizontal rails.

7.11 *Concrete Walls*—When specified, the top surface of any concrete wall shall have a crowned finish to shed water, unless field conditions require sloping in one direction for water runoff. Refer to 7.16.2, 7.16.3, and 7.16.4 for alternative methods of security and erosion control along the bottom of the fence. Serious erosion problems shall be engineered to direct water runoff away from the fence.

7.12 *Post Tops and Extension Arms*, used on fences having electronic detection devices shall be tack welded or attached to the posts by other suitable means to prevent any degree of mechanical noise that would cause a nuisance alarm. Recondition damaged surfaces caused by welding etc. with rust preventive coatings in accordance with Specification A 780.

7.13 *Rails, Braces, and Truss Rods*, shall be installed on the outside of the fence away from the inmates.

7.14 *Top Rail*—(with sleeves), shall run continuously through the top caps or extension arms. Straight runs of top rail exceeding 500 ft (152 m) or more, and require a minimum of one expansion sleeve. Carriage bolts used for attachment at terminal posts shall be placed with the threaded ends on the outside of the fence, away from the inmates.

7.15 *Intermediate and Bottom Rails*, shall be connected to terminal posts with brace bands and rail ends, and the line posts with brace bands and rail ends or boulevard clamps. Carriage bolts shall be placed with the threaded ends on the outside of the fence away from the inmate. Bottom rails on fences where a grade beam is specified shall be anchored to the grade beam with a $\frac{3}{8} \times 1\text{-}1/2$ -in. (9 × 38-mm) galvanized steel bar and $\frac{3}{8}$ -in. (9-mm) diameter galvanized U-bolt. This anchor is located one-half the distance between posts. Threaded ends of U-bolts shall be on the outside of the fence away from the inmate. Where a grade beam is not specified, the rail shall be anchored in a similar manner to a footing as shown in Fig. 2.

7.16 *Fabric*—Fabrics on perimeter fences are placed on the inmate side of the secure enclosure. Maintain a $1\text{-}1/2 \pm 1/2$ -in. (38 ± 13-mm) maximum clearance above finish grade unless otherwise specified.

7.16.1 *Terminal Connections*—Fabric shall be attached to end, corner and pull posts with tension bands and tension bars. Spacing between tension bands shall not exceed 12 in. (305

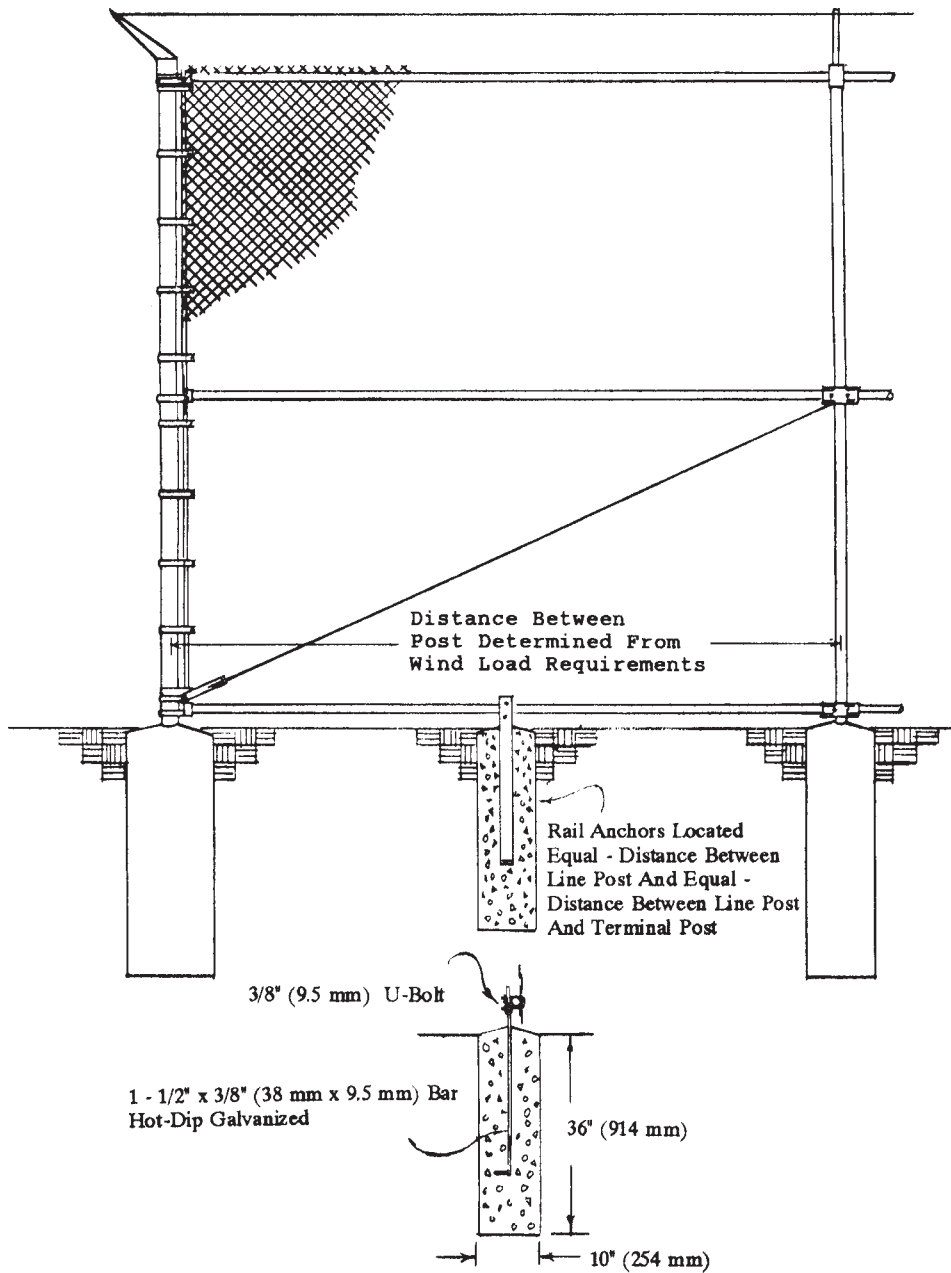


FIG. 2 Corner Bracing and Bottom Rail Anchor

mm). Carriage bolts on tension bands shall be placed with the threaded ends on the outside of the fence away from the inmate.

7.16.2 *Buried Fabric*—If the fence design calls for fabric to be buried below grade, provide a separate piece of PVC-coated fabric (for additional corrosion protection) 18 in. (457 mm) wide extending 12 in. (305 mm) into a trench and overlap the above-grade fabric by 6 in. (152 mm). The overlapping sections of fabric shall be secured to a bottom rail with tie wires as specified in 7.16. Back fill and thoroughly compact the soil around the buried section of the fabric. If the buried fabric option is selected, then the bottom of the buried fabric shall be the new subgrade line. The specified depth of the post footing

shall be measured from that point. A separate piece of buried fabric provides unlimited access to the fence panel for repairs or restretching

NOTE 8—Buried fabric is not recommended in areas affected by frost.

7.16.3 For those areas affected by frost, install a 4-in. (101-mm) minimum thick by 36-in. (914-mm) wide concrete slab (sidewalk) adjacent to the base of the interior or exterior fence. Maintain $2.0 \pm \frac{1}{2}$ -in. (25 ± 13 mm) clearance between concrete slabs and fence structure. In areas where frost may occur, increase clearance as needed to prevent any physical contact between the slabs and fence structure. Locate the slab

inside or outside, or on both sides of the fence, where digging under the fence is a potential threat.

7.16.4 *Concrete Slabs*—Prevent growth at the base of fences, provide a clear line of sight along the fence line and control minor erosion problems (see Fig. 3).

7.17 *Securing of Fabric (Options)*—When using tie wires, fabric shall be secured to line posts and all rails at maximum 12-in. (305-mm) intervals. For Option 1, if the fabric is of all one mesh and wire gage, it shall be in one piece up to a height of 20 ft (6.1 m). For Option 2, if two or more pieces of fabric are specified, each shall overlap the other a minimum of 6 in. (152 mm) and be secured to a horizontal rail at the center of the overlap with tie wires as specified.

7.17.1 *Preformed Manually Fastened or Power-Twisted Round Wire Tie Options (Option 1)*—Wire ties shall be of sufficient length to extend across a minimum of one full diamond on the inmate side of the fence. Each preformed tie shall wrap around the fabric and post or rail 360°. The two ends are twisted together three full twists forcing the ties to draw the chain link fabric to the post or rail. Twisted ends of the ties are located away from the inmate side of the fence (see Fig. 1).

7.17.1.1 Ties on single perimeter fences shall be bend down on post and over on rails parallel with the rail. Ties on interior

fences where there are no inmates; bending of ties not required. Ties on control fences, where inmates are on both sides of the fence, twisted ends are removed, leaving a minimum of three twists and bent out of the way to prevent accidental contact causing injury. Side ties are recommended for those areas where protruding ends may become a hazard (see Fig. 1).

7.17.1.2 *Overlapping Fabric Ties*—Where one fabric overlaps another at the rail, ties shall be of sufficient length to extend across one full diamond of both fabrics. Each preformed tie shall wrap around the fabric and rail 360°. The two ends are twisted together three full twists forcing the ties to draw the chain link fabric to the rail. Twisted ends of the ties are located away from the inmate side of the fence (Fig. 1).

7.17.2 *Manually Fastened Round Wire Ties (Option 2)*—Wire ties shall be hooked to one picket of the fabric, pulled across the outside of the post or rail, and attached to the closest picket of the fabric at the opposite side of the post or rail. Both ends shall then be twisted around the fabric picket a minimum of two complete turns to pull the fabric into close contact with the post or rail. Cut off any excess wire ends to prevent untwisting by hands.

7.17.3 *Steel Strap and Bolt Method (Option 3)*—Fabric connection to terminal posts, fabric shall be sandwiched

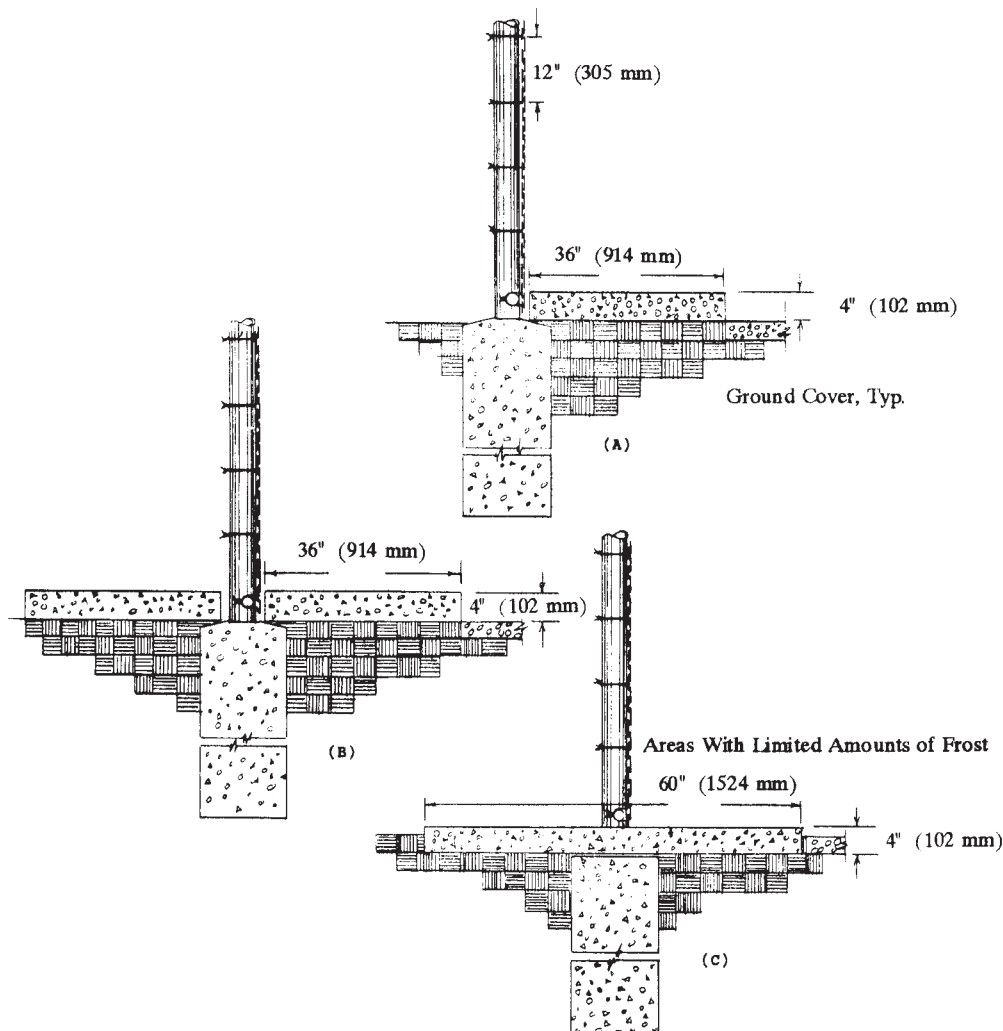


FIG. 3 Perimeter Fence, Concrete Slab Options

between post and continuous $\frac{3}{16} \times 3$ in. (4.8 × 76-mm) vertical galvanized steel or PVC-coated strap. Fabric and strap shall be attached to post using $\frac{3}{8} \times 8\text{-}1/2$ in. (9.5 × 216-mm) carriage bolts spaced 20 in. (508 mm) on center. Threaded ends of bolts are placed away from inmate side of fence and peened (see Fig. 4)

7.17.3.1 Fabric connected to line post, select Options 1, 2, and 4.

7.17.3.2 *Top and Bottom Fabric Connection Between Line Post*, fabric shall be sandwiched between two continuous $\frac{3}{16} \times 3$ -in. (4.8 × 76-mm) galvanized, or galvanized and PVC-coated flat bars attached together with two rows of $\frac{3}{8}$ (9.5 mm) × 2-1/2 in. (64-mm) carriage bolts, staggered 12 in. (305 mm) on center. Threaded ends of bolts, located away from the inmate side of fence are peened to prevent disconnecting. Steel straps shall be zinc (hot-dip galvanized) coated in accordance with Specification A 123. Steel hardware shall be zinc (hot-dip galvanized) coated in accordance with Specification A 153/A 153M (see Fig. 5).

7.17.4 *Power-Driven Fasteners (Option 4)*—Power driven fasteners consisting of a knurled pin of AISI 1062 modified or 1566 carbon steel, heat treated to a hardness of RC 52-56 and a minimum tensile strength of 240 000 psi (1655 MPa). Finish shall be zinc electroplating of 0.0003 in. (0.0076 mm) minimum thickness, and evaluated for corrosion resistance for 72 consecutive hours with no signs of rust or corrosion when tested in accordance with Test Method B 117. The specialty designed cap for holding the fabric in place shall be fabricated from Type 304 stainless steel $\frac{3}{32}$ -in. (2.38-mm) thick. For 9-gage (3.9-mm) or 11-gage (3.1-mm) fabric other than $\frac{3}{8}$ -in. (9.53-mm) mesh, pin shall be 1 in. (25.4 mm) long. For $\frac{3}{8}$ -in. (9.53-mm) mesh and 6-gage (4.9-mm) fabric, pin shall be 1.25 in. (31.75 mm) long (see Fig. 6).

7.18 *Threaded Connectors and Accessories*—After installation, all threaded connectors shall be peened or tack welded to prevent removal. Any damage to the galvanized finish shall be repaired by the application of a suitable zinc-rich cold galvanizing compound, in accordance with Practice A 780.

7.19 *Fabric Tension, (Owner Option)*:

7.19.1 *Installation*—Fabric tension during installation shall conform to Table X1.6. Amount of maximum deflection shall be equal to that specified for the temperature recorded at the time of installation.

7.19.2 *Fabric Testing (see Fig. 7)* —Test fabric tension by applying a 30-lb force (133 N) perpendicular to the midpoint, centered vertically between rails and horizontally between two posts. Maximum deflection shall conform with Table X1.6, in accordance with the ambient temperature when tested. Every eighth lower panel shall be tested along the fence line. Fabric shall return to its original position when force is released. All panels failing the test shall be resecured and retested.

NOTE 9—Boundary fences or other fences not considered as being a security fence need not include this test method. Fence panel testing is recommended for security fences, especially where electronic detection is an integral part of the fence system (see Table X1.6).

7.20 *Barbed Wire*—Stretch tightly between terminal post corner arms and secure into slots in line post extension arms.

7.21 *Tension Wire*—Stretch tightly between terminal post and attach to line posts with tie wires in the same manner described in 7.16. Where tension wire or barbed wire is employed to support barbed tape at the top of the fence, only one wire is required. Securely fasten tension wire or barbed wire into end slot of line post extension arms.

NOTE 10—In those locations where standard extension arms will not support tension as a result of keeping the barbed wire or tension wire taut, it may be necessary to fabricate a rigid arm from galvanized pipe or angle and weld it at the desired angle and height to the terminal post. This will allow uninterrupted continuation of the barbed wire or tension wire and provide termination to a solid member. More importantly, it will provide uniform continuity of the barbed tape.

7.22 *Barbed Tape (Security Coils)*, installation shall be as specified in accordance with Specification F 1911.

7.22.1 Refer to manufacturer’s printed instructions for placement, splicing, coil attachments, and length tolerances. Consult the barbed tape manufacturer for applications where barbed tape is attached to gates and adjacent areas.

7.22.2 *Security Coils Installed as a Ground Barrier* shall be anchored a maximum of 10 ft (3.05 m) on center with a number

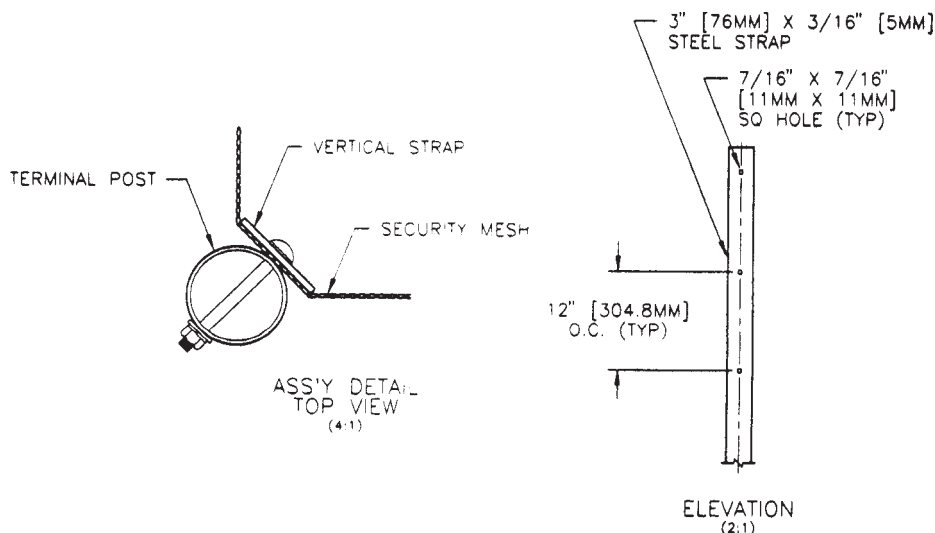


FIG. 4 Vertical Strap for Attaching Security Mesh to Terminal Post

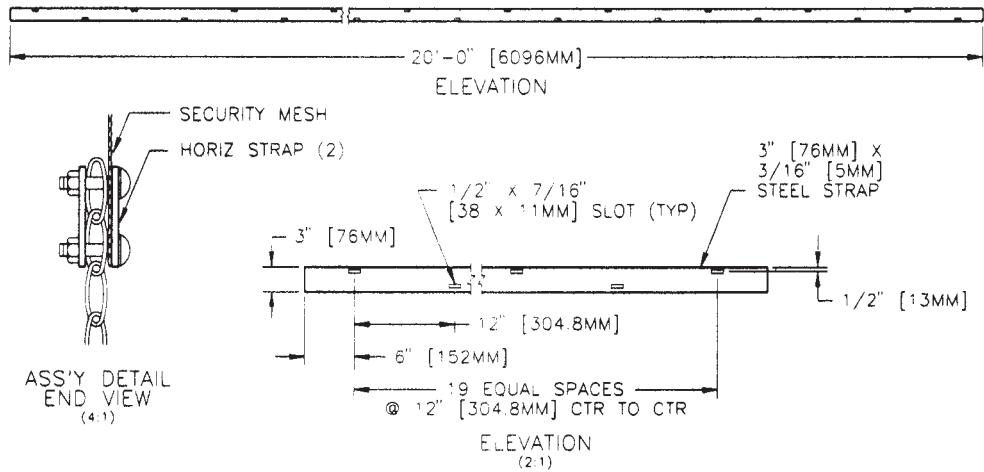


FIG. 5 Horizontal Girth Strap for Splicing Security Mesh

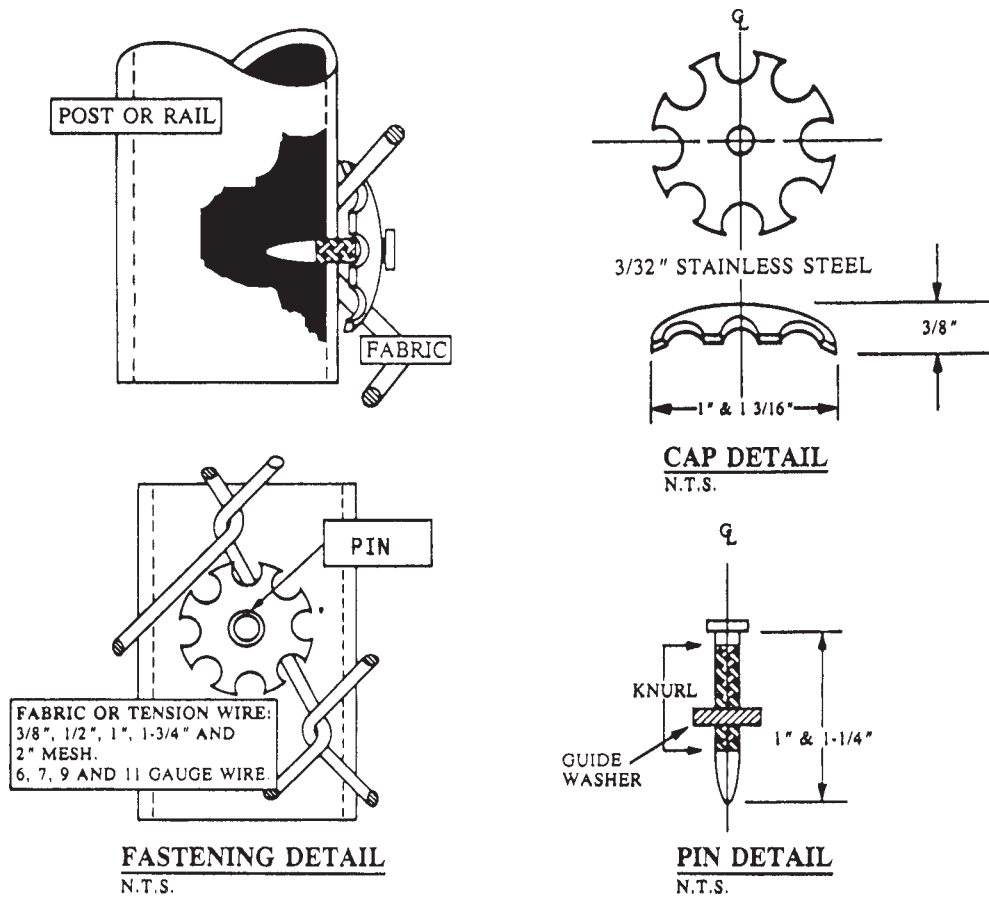


FIG. 6 Power Driven Fasteners

3 AISI Grade 60 galvanized reinforcing bar stake 22 in. (559 mm) long, with one end fashioned into a small candy cane type hook to secure the barrier in place. After forming, the overall length of the stake shall be a minimum of 18 in. (457 mm) long. Other suitable alternatives may be designed for this purpose (see Fig. 8).

7.23 *Gates General*—Fences intersecting gate areas where the gates are taller than the fence shall incorporate an angled

panel on both sides of the gate. This will provide an uninterrupted transition of the fence fabric and barbed tape to the taller gates. Gates with transoms also shall be included in this design. Swing gate areas vulnerable to escapes or unauthorized entries can be improved upon by constructing the gate within the fence framework. Vehicle gates requiring vertical clearances of 14 ft(4.3 m) and higher, shall include a minimum 2-ft(.6-m) high transom across the top of the gate opening. Transoms allow the

Material:

Adjustable Height Tripod—24-in. (610-mm) flat steel scale with 5/16-in. diameter hole in one end; 0–50 lbs (0–23 kgs) capacity digital fish scale or equivalent.

Instructions:

Fasten the 24-in. (610-mm) flat steel measuring scale to the top of the tripod; this will provide a sturdy platform from which deflection measurements can be taken.

Measure vertically and horizontally to locate the center of the lower panel. Place the unattached end of the steel scale through a diamond near the center of the panel. Align the picket with the end of the steel scale or one of the inch or millimeter marks.

Attach the hook of the fish scale around the nearest picket to the test point, taking care not to disturb the tripod setting. Apply a pulling force, to the fish scale until 30 lbs (13.6 kgs) is reached. Upon reaching 30 lbs (13.6 kgs), record the amount of deflection in inches or millimeters.

The deflection taken from either side of the fence panel should equal the dimensional requirements relative to the ambient temperature from Table X1.6.

The amount of deflection depends on the temperature range selected at the time of the installation or during the inspection.

Repeat this procedure every eighth panel.

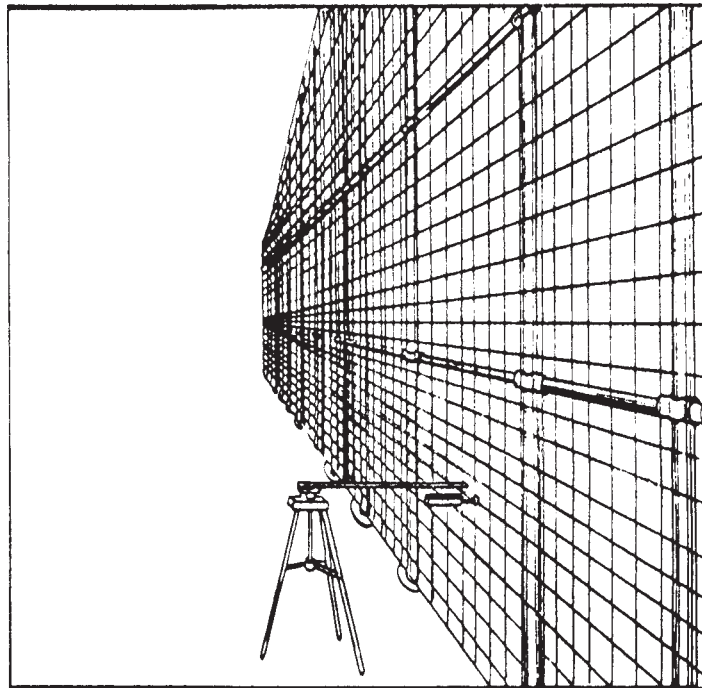


FIG. 7 Method for Measuring Chain Link Fabric Deflection

uninterrupted continuation of barbed tape over the gate. Clearance between the gate and fence framework shall not exceed 2.0 in. (51 mm) (see Fig. 9).

7.23.1 *Gates*—Where electronic detection systems are employed on the fence, isolate all gates from the fence line to prevent transference of vibration. Gate posts (hinge posts and latch posts) shall be placed in line with terminal posts and may share the same footing but shall not be in contact with the terminal posts. Maximum distance between gate posts and terminal posts shall be 2 in. (50 mm), and the diameter of the

post footing shall be increased by a minimum of three times the diameter of the additional post. Gate frames shall be designed heavily enough to resist being forced apart (see Fig. 10). For overhead track and cantilever sliding gates, provide drawings showing details of gate installation.

7.24 Provisions for Electronic Detection Systems:

7.24.1 Contact the manufacturer for system selection and special instructions regarding their system.

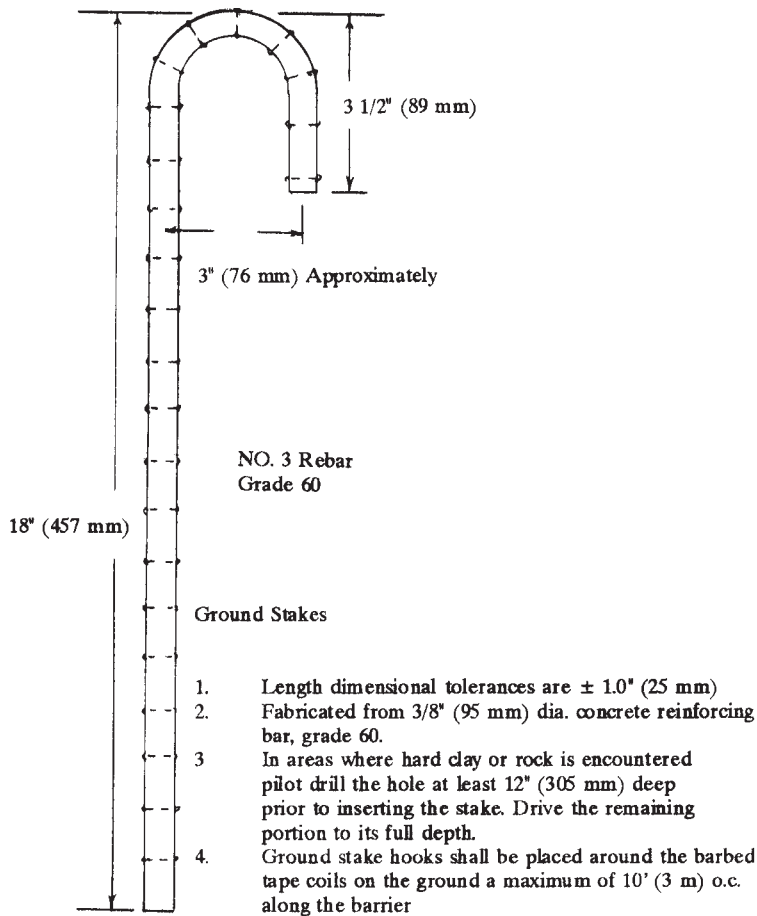


FIG. 8 Barbed Tape Ground Anchors

7.24.2 Eliminate all wind-induced vibrations and rattles of fabric against posts and rails by placing additional tie wires where necessary.

7.24.3 Eliminate all rattles from bolted end fittings by apply additional tightening. To accomplish this, it may be necessary to secure diagonal truss rods to fabric with tie wires instead of hog rings (see Fig. 1).

7.24.4 *Testing of Fence Post (Owner Option)*—Test fence post rigidity by applying a 50-lb(22.7-kg) force (222-N) to the post, perpendicular to the installed fabric, at mid-height of the post. Post movement at the point where the force is applied shall not exceed 3/4 in. (19 mm) from the relaxed position. Test every eighth post for rigidity. Where a post fails this test, further tests on the next four posts on either side of the failed post shall be made. Disposition of all failed posts shall be the responsibility of the owner.

NOTE 11—Procedure stated for testing fence posts, is a modification of U.S. Army Corps of Engineer's Specification, CEGS 02831.

7.24.5 *Testing of Fabric*, in accordance with 7.19.2

7.25 *Grounding*—Grounding and bonding shall be in accordance with the NFPA 70, National Electric Code (NEC), and the ANSI 2, National Electric Code (NESC) and as specified herein.

7.25.1 *Fences Crossing Powerline of 600 V or More*, shall be grounded at or near the point of crossing and at distances not exceeding 150 ft (46 m) on each side of crossing. Where

electronic detection is an integral part of the fence, grounding electrodes shall be installed at 100-ft (30-m) intervals along the fence line. Bonding jumpers shall attach the rows of barbed tape to the metal fence post. Secure the conductor to the fence post with an approved ground clamp. Bonding jumpers shall not be less than No. 6-AWG (4.7-mm) bare copper conductor (see Fig. 11).

7.25.2 *Grounding Electrode*, shall a minimum 3/4-in. (13-mm) diameter \times 10-ft (2.4-m) long copper clad rods. Grounding rods shall be driven into the earth until the top is 12 in. (305 mm) below grade. Attach a No. 2 AWG (7.4-mm) bare standard copper conductor by exothermically welding to the grounding rods. Extend the NO. 2 AWG (7.4 mm) conductor underground to the fence post. Secure the conductor to the post with 5/16-in. diameter (8-mm) self-tapping galvanized or stainless steel bolt and approved copper compression fitting or clamp. For double fence configurations, provide a No. 2 AWG (7.4 mm) copper conductor between the two fences, grounding rods are placed at 300 to 500-ft(91 to 152-mm) intervals (see Fig. 11).

7.25.3 *Gate Grounding*—Swing Gates breaking a continuous run of fence, shall have a flexible copper braid bonding jumper attached from each gate post to the gate frame. Grounding clamps and bonding jumper shall have a minimum ampere rating of 190. For all gates that interrupt the fence line, continue the grounding continuity of the fence by installing a ground rod, next to one of the gate posts, as described in

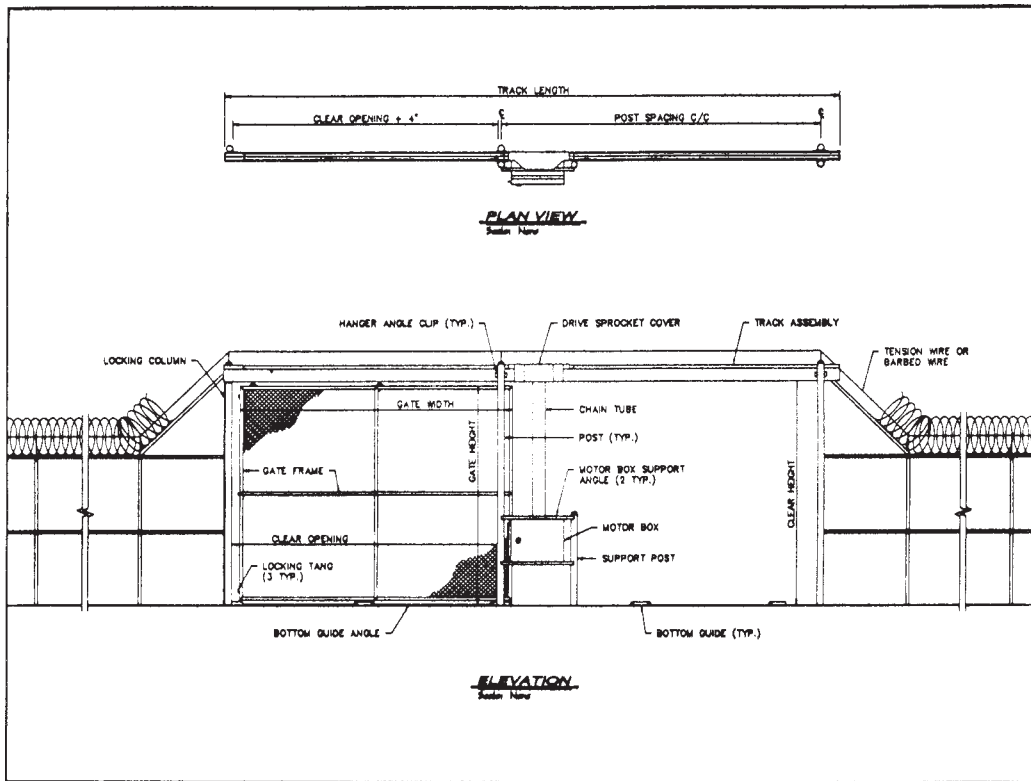


FIG. 9 Fence to Gate Transition with Angled Panel

7.25.2. A No. 2 AWG (7.4-mm) copper conductor, common to the gate posts and grounding rod, shall extend underground to the opposite gate post.

7.25.4 After grounding connections have been completed, perform a ground resistance test in the presence of the owner's representative. The ground resistance shall not exceed 25 ohms under normal dry conditions. Where resistance requirements cannot be attained, install additional grounding rods not closer than 6 ft (1.8 m) on center. Install no more than two additional grounding rods at each location.

7.26 *Soil Sterilization*—Following the completion of the fence, grounding provisions and electronic detection system, the soil along the fence line or within the zone between double perimeter fences shall be sterilized by the following method.

7.26.1 Apply a suitable sterilant, taking care to prevent blowing over or spillage onto any areas not designated for treatment. A certificate of treatment shall be issued to the owner's representative, stating the materials and quantities used and the date of application.

7.26.2 Install a minimum 6-mil (0.15-mm) thick black polyethylene sheeting or soil separation fabric, laid continuously with a minimum of 6-in. (152-mm) overlap at all joints.

If puncturing of the barrier occurs during installation, overlay as necessary with additional sheeting.

7.26.3 Lay a 3-in. (76-mm) thick continuous bed of random size ¾ to 2-in. (19 to 51-mm) stones uniformly spread over the sterilization barrier. Stone may be either clean crushed stone or washed gravel. For microwave installations, in the zone between double perimeter fences, smaller stone may be required. Contact the manufacturer of the system for advice, regarding size and type of stone.

7.26.4 State and federal health and safety regulations governing such applications shall be strictly followed.

7.27 *Temporary Fence*—The contractor shall be responsible for the removal of any temporary fence, the restoration of site conditions to the satisfaction of the owner's representative, and the salvage and return to the facility of all removed materials.

7.28 *Cleanup*—Upon completion of the installation, clean-up all waste material resulting from the fence construction.

8. Keywords

8.1 barrier systems; detention and correctional facilities

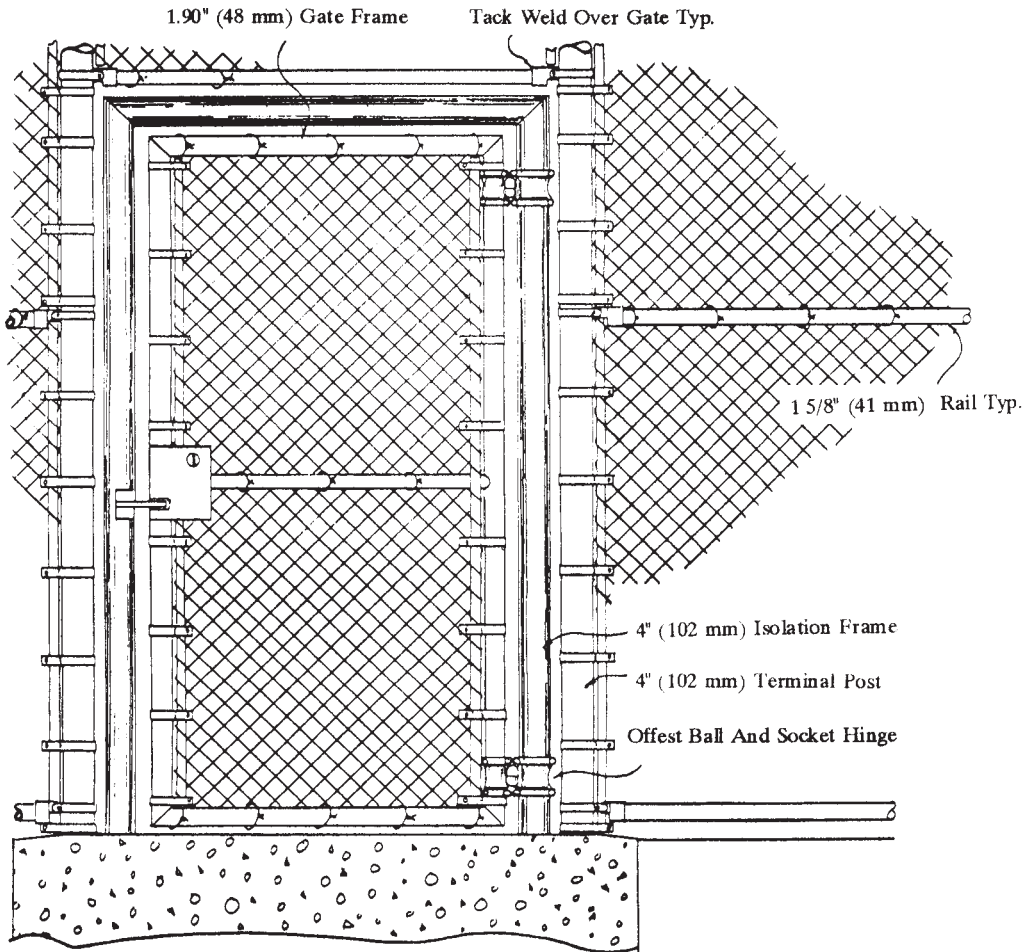
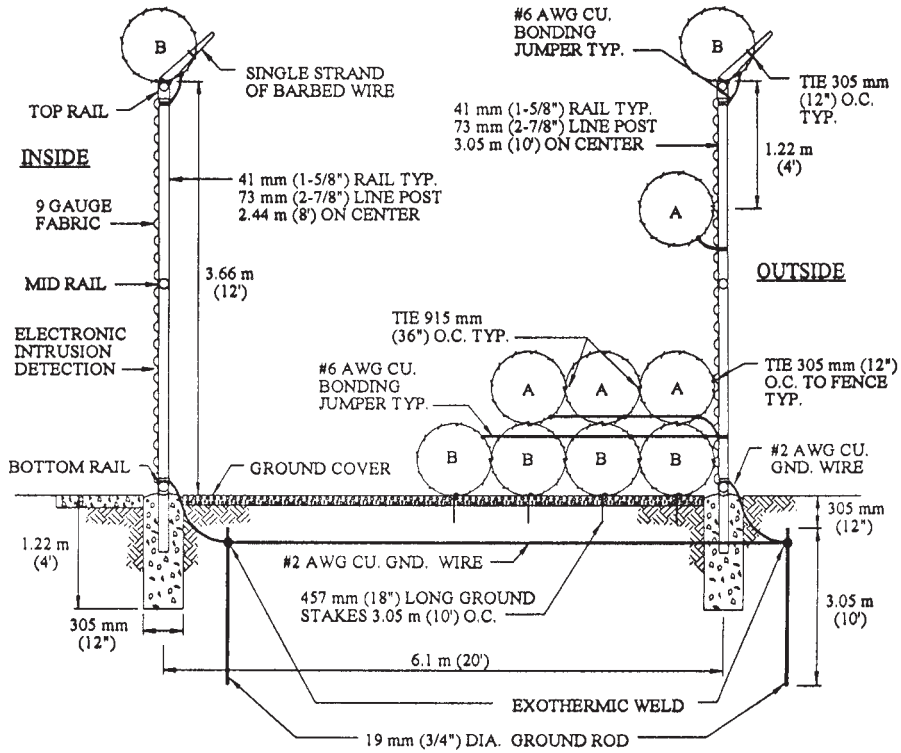


FIG. 10 Isolated Gate Frame Assembly for Security Fencing With Electronic Detection Mounted on the Fence



NOTE 1—Connect a No. 2 AWE cubic conductor between the ground rod and the metal fence post. Attach to the metal fence post with a ground clamp. Bond all barbed tape to the metal fence post with a No. 6 AWG cubic conductor. Bond to the metal fence post with a ground clamp.

FIG. 11 Security Fence Grounding

APPENDIX

(Nonmandatory Information)

X1. ADDITIONAL INFORMATION

X1.1 Tables X1.1-X1.9 include additional wind load information in normal soil conditions.

TABLE X1.1 Measurement of Fabric Deflection Chain-Link Mesh Size 2 in. Deflection = 30 lbf, 6 to 10-ft Post Spacing

6 Gage		6 Gage		9 Gage		9 Gage	
Temperature Range 0–80		Temperature Range 30–110		Temperature Range 0–80		Temperature Range 30–110	
Instl. Temperature	Deflection, in.	Instl. Temperature	Deflection, in.	Instl. Temperature	Deflection, in.	Instl. Temperature	Deflection, in.
0	2.13	30	2.13	0.	2.03	30	2.03
10	2.17	40	2.17	10	2.11	40	2.11
20	2.21	50	2.21	20	2.20	50	2.20
30	2.25	60	2.25	30	2.29	60	2.29
40	2.30	70	2.30	40	2.39	70	2.39
50	2.35	80	2.35	50	2.49	80	2.49
60	2.40	90	2.40	60	2.59	90	2.59
70	2.45	100	2.45	70	2.70	100	2.70
80	2.50	110	2.50	80	3.00	110	3.00

Notes:

- (1) Chain link deflection for those areas where temperatures commonly range from 0° - 80° and 30° - 100°.
- (2) All deflection measurements are taken from lower panels if more than two rails are used.
- (3) *Electronic Installations:* Fence panels, with sensors, not to exceed 60 ft² for fence heights 10-ft and above.
- (4) *Deflection Tolerance:* ± 1/8 in.
- (5) Degrees in Fahrenheit.
- (6) See (Fig. 7) for test method.

TABLE X1.2 Measurement of Wind Velocity for Chain Link Fence (With Round Steel Framework) Single Fabric 2 in. × 9 Gage Number of Rails, 2 for Fence Heights 8 ft –10 ft Number of Rails, 3 for Fence Heights 12 ft–16 ft

Type	Line Post	8 ft	9 ft	10 ft	12 ft	14 ft	15 ft	16 ft
Group	Wall, in. O.D., in.	Max Wind Velocity ± 5 mph						
IA ^A	.154 2-3/8	93	85	77	63	55	52	49
IC ^A	.130 2-3/8	113	102	93	76	69	62	59
IA ^A	.203 2-7/8	127	114	104	85	74	70	66
IC ^A	.160 2-7/8	148	134	116	100	87	82	77
IA ^A	.216 3-1/2	157	142	129	105	92	86	81
IC ^A	.160 3-1/2	161	147	120	104	98	93	
IA ^A	.226 4.0	164	151	121	106	100	95	
IC ^A	.160 4.0		166	135	118	111	105	
IA ^A	.237 4-1/2		170	138	120	113	107	
IC ^A	.160 4-1/2			150	131	123	116	
IA ^A	.280 6-5/8				182	171	161	

^AIA and IC refers to post conforming to Specification F 1043.

TABLE X1.3 Measurement of Wind Velocity for Chain-Link Fence (With Round Steel Framework) Single Fabric 2 in. × 6 Gage Number of Rails for Fence Heights 8–10 ft Number of Rails 3 for Fence Heights 12–16 ft 8-ft Post Spacing

Type	Line Post	8 ft	9 ft	10 ft	12 ft	14 ft	15 ft	16 ft
Group	Wall, in. O.D., in.	Max Wind Velocity ± 5 mph						
IA ^A	.154 2-3/8	95	85	78	63	55	52	49
IC ^A	.130 2-3/8	114	103	94	76	66	62	59
IA ^A	.203 2-7/8	128	115	105	85	74	70	66
IC ^A	.160 2-7/8	150	135	123	100	87	82	77
IA ^A	.216 3-1/2	159	143	130	106	92	87	82
IC ^A	.160 3-1/2	181	163	148	148	105	99	93
IA ^A	.226 4.0	184	165	151	129	122	107	100
IC ^A	.160 4.0		184	168	136	119	112	105
IA ^A	.237 4-1/2			171	139	121	114	108
IC ^A	.160 4-1/2			187	152	132	124	117
IA ^A	.280 6-5/8				211	184	172	162

^AIA and IC refers to post conforming to Specification F 1043.

TABLE X1.4 Measurement of Wind Velocity for Chain-Link Fence (With Round Steel Framework) Top 3/8 in. × 11–9 Gage (Upper 1/2 of Fence) Bottom 2 in. × 9–6 Gage Number of Rails, 3, 8-ft Post Spacing

Type	Line Post	8 ft	9 ft	10 ft	12 ft	14 ft	15 ft	16 ft
Group	Wall, in. O.D., in.	Max Wind Velocity ± 5 mph						
IA ^A	.154 2-3/8	48	43	39	32	28		
IC ^A	.130 2-3/8	57	51	46	39	34		
IA ^A	.203 2-7/8	65	58	53	44	38	36	34
IC ^A	.160 2-7/8	77	69	62	52	45	42	40
IA ^A	.216 3-1/2	83	74	67	56	48	45	42
IC ^A	.160 3-1/2	94	84	76	64	55	51	48
IA ^A	.226 4.0	97	87	78	66	57	53	50
IC ^A	.160 4.0	108	96	87	73	63	59	55
IA ^A	.237 4-1/2	112	100	90	76	65	61	57
IC ^A	.160 4-1/2	122	109	98	82	71	66	62
IA ^A	.280 6-5/8	178	159	144	120	104	97	91

^AIA and IC refers to post conforming to Specification F 1043.

TABLE X1.5 Measurement of Wind Velocity for Chain-Link Fence (With Round Steel Framework) Fabric Combination Top 3/8 in. × 11–9 Gage (Upper 4 ft of Fence) Bottom 2 in. × 9–6 Gage Number of Rails, 3 for Fence Heights 8–12 ft, Number of Rails, 4 for Fence Heights 14–16 ft, 8-ft Post Spacing

Type	Line Post	8 ft	9 ft	10 ft	12 ft	14 ft	15 ft	16 ft
Group	Wall, in. O.D., in.	Max Wind Velocity ± 5 mph						
IA ^A	.154 2-3/8	48	43	41				
IC ^A	.130 2-3/8	57	53	49				
IA ^A	.203 2-7/8	65	60	56	49	44	42	
IC ^A	.160 2-7/8	77	71	66	58	51	49	
IA ^A	.216 3-1/2	83	76	71	62	55	53	50
IC ^A	.160 3-1/2	94	87	80	71	63	60	57
IA ^A	.226 4.0	97	89	83	73	64	61	59
IC ^A	.160 4.0	108	99	92	81	72	68	65
IA ^A	.237 4-1/2	112	103	95	84	74	71	68
IC ^A	.160 4-1/2	122	112	104	91	81	77	74
IA ^A	.280 6-5/8	178	163	151	133	117	112	107

^AIA and IC refers to post conforming to Specification F 1043.

TABLE X1.6 Measurement of Wind Velocity for Chain-Link Fence (With Round Steel Framework) Single Fabric 2 in. × 9 Gage Mesh Number of Rails, 2 for Fence Heights 8–10 ft, Number of Rails, 3 for Fence Heights 12–16 ft, 10-ft Post Spacing

Type	Line Post	8 ft	9 ft	10 ft	12 ft	14 ft	15 ft	16 ft
Group	Wall, in. O.D., in.	Max Wind Velocity ± 5 mph						
IA ^A	.154 2-3/8	86	77	71	57			
IC ^A	.130 2-3/8	103	93	85	69			
IA ^A	.203 2-7/8	116	105	95	78	68	64	60
IC ^A	.160 2-7/8	136	123	112	91	79	75	71
IA ^A	.216 3-1/2	144	130	119	97	84	79	75
IC ^A	.160 3-1/2	164	148	135	110	96	90	85
IA ^A	.226 4.0	168	151	138	112	98	92	87
IC ^A	.160 4.0	187	168	153	125	109	102	97
IA ^A	.237 4-1/2	191	172	157	128	111	105	99
IC ^A	.160 4-1/2		188	171	139	121	114	108
IA ^A	.280 6-5/8				195	170	160	151

^AIA and IC refers to post conforming to Specification F 1043.

TABLE X1.7 Measurement of Wind Velocity for Chain-Link Fence (With Round Steel Framework) Fabric Combination Top $\frac{3}{8}$ in. \times 11–9 Gage ($\frac{1}{2}$ the Fence Height) Bottom 2 in. \times 9–6 Gage Number of Rails 3, 10-ft Post Spacing

Type	Line Post		8 ft	9 ft	10 ft	12 ft	14 ft	15 ft	16 ft
Group	Wall, in.	O.D., in.	Max Wind Velocity \pm 5 mph						
IA ^A	.154	2- $\frac{3}{8}$	43	40	37	32			
IC ^A	.130	2- $\frac{3}{8}$	52	46	42	35			
IA ^A	.203	2- $\frac{7}{8}$	59	53	48	40	34	32	
IC ^A	.160	2- $\frac{7}{8}$	69	62	56	47	40	38	
IA ^A	.216	3- $\frac{1}{2}$	74	67	60	51	44	41	38
IC ^A	.160	3- $\frac{1}{2}$	85	76	69	58	50	46	44
IA ^A	.226	4.0	87	78	71	59	51	48	45
IC ^A	.160	4.0	97	87	79	66	57	53	50
IA ^A	.237	4- $\frac{1}{2}$	101	90	81	68	59	54	52
IC ^A	.160	4- $\frac{1}{2}$	110	98	89	74	64	60	56
IA ^A	.280	6- $\frac{5}{8}$	161	144	130	109	94	88	83

^AIA and IC refers to post conforming to Specification F 1043.

TABLE X1.8 Measurement of Wind Velocity for Chain-Link Fence (With Round Steel Framework) Single Fabric 2 in. 6 Gage Number of Rails 2 for Fence Heights 8–10-ft, Number of Rails 3 for Fence Heights 12–16 ft, 10-ft Post Spacing

Type	Line Post		8 ft	9 ft	10 ft	12 ft	14 ft	15 ft	16 ft
Group	Wall, in.	O.D., in.	Max Wind Velocity \pm 5 mph						
IA ^A	.154	2- $\frac{3}{8}$	86	78	71	57	50	47	45
IC ^A	.130	2- $\frac{3}{8}$	104	94	86	69	61	57	54
IA ^A	.203	2- $\frac{7}{8}$	117	105	96	78	68	64	60
IC ^A	.160	2- $\frac{7}{8}$	137	124	113	91	80	75	71
IA ^A	.216	3- $\frac{1}{2}$	146	132	120	97	85	80	75
IC ^A	.160	3- $\frac{1}{2}$	166	150	137	111	97	91	86
IA ^A	.226	4.0	169	153	139	113	99	93	87
IC ^A	.160	4.0		170	155	126	110	103	97
IA ^A	.237	4- $\frac{1}{2}$		174	158	129	112	106	100
IC ^A	.160	4- $\frac{1}{2}$			173	140	122	115	109
IA ^A	.280	6- $\frac{5}{8}$				197	172	161	152

^AIA and IC refers to post conforming to Specification F 1043.

TABLE X1.9 Measurement of Wind Velocity for Chain-Link Fence (With Round Steel Framework) Fabric Combination Top $\frac{3}{8}$ in. \times 11–9 Gage (4 ft from the Top of Fence) Bottom 2 in. \times 9–6 Gage Number of Rails, 3 for Fence Heights 8–12 ft, Number of Rails, 4 for Fence Heights 14–16 ft, Rails 3 Equal Distance 1- $\frac{5}{8}$ in. Diameter, 10-ft Post Spacing

Type	Line Post		8 ft	9 ft	10 ft	12 ft	14 ft	15 ft	16 ft
Group	Wall, in.	O.D., in.	Max Wind Velocity \pm 5 mph						
IA ^A	.154	2- $\frac{3}{8}$	42	39	37	32			
IC ^A	.130	2- $\frac{3}{8}$	52	48	44	39			
IA ^A	.203	2- $\frac{7}{8}$	59	54	50	44	39	38	36
IC ^A	.160	2- $\frac{7}{8}$	69	63	59	52	46	44	42
IA ^A	.216	3- $\frac{1}{2}$	74	69	64	56	50	47	45
IC ^A	.160	3- $\frac{1}{2}$	85	78	72	64	57	54	52
IA ^A	.226	4.0	87	80	75	66	58	56	53
IC ^A	.160	4.0	97	90	83	73	65	62	59
IA ^A	.237	4- $\frac{1}{2}$	101	93	86	76	67	64	61
IC ^A	.160	4- $\frac{1}{2}$	110	101	94	84	73	70	67
IA ^A	.280	6- $\frac{5}{8}$	161	148	137	121	107	102	97

^AIA and IC refers to post conforming to Specification F 1043.

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