

710.01

ITEM 710 FENCE AND GUARDRAIL

710.01 Barbed Wire. Provide barbed wire in accordance with ASTM A 121, Type Z, Class 3 Galvanizing, or ASTM A 585, Type I, with the following modifications:

A. ASTM A 121, Type Z, Class 3.

6.3.1 Provide the weight of coating for various gages of wire composing the strands and barbs not less than 0.80 ounces per square foot (244 g/m^2) of surface.

7.1 Provide No. 12 1/2, 13 1/2 or 15 1/2 steel wire gage barbed wire. Provide four point round steel wire barbs spaced 5 inches (130 mm) center-to-center.

9.1 Select one sample, as per Section 9.2, from each 50 spools or fraction thereof.

11.1 Perform inspection at the project site.

Provide certified material in accordance with ODOT Supplement 1067.

B. ASTM A 585, Type I.

12.3 Does not apply.

14.1 Perform inspection at the project site.

Provide certified material in accordance with ODOT Supplement 1067.

710.02 Woven Steel Wire Fence, Type 47. Provide woven steel wire fence in accordance with ASTM A 116, Type Z, Class 3 galvanizing, with the following modifications:

7.1 Design the fence fabric using design number 1047-6.9.

11.1 Perform inspection at the project site.

In addition, galvanize all hardware and attachments in accordance with Section 711.02.

Provide certified material in accordance with ODOT Supplement 1067.

710.03 Chain-Link Fence. Provide chain-link fence in accordance with AASHTO M 181, with the following modifications:

3.1 Provide posts, gate frames, post braces, and top rails made of Type I or Type III material. Provide Type I material conforming to the requirements of Table 710.03-1. Provide Type III material conforming to the requirements of Table 710.03-2.

Provide top rails in lengths not less than 18 feet (5.5 m).

Fasten the fabric to the posts using either aluminum alloy or galvanized steel bands or wires. Provide wires that have a 0.148-inch (3.7 mm) minimum diameter and a zinc coating or steel fasteners that are not less than 0.8 ounces per square foot (244 g/m^2).

Provide stretcher bars having a $3/4 \times 3/16$ -inch ($19 \times 5 \text{ mm}$) cross-section or an equivalent cross-section with a length equal to full height of fabric.

Provide steel truss rods that have a steel $3/8$ -inch (9.5 mm) diameter or equivalent cross-section and having suitable adjustment.

TABLE 710.03-1 STEEL POSTS, GATE FRAMES, POST BRACES, AND TOP RAILS

Usage – nominal fence height 6 ft or less	Section Thickness	Outside Diameter or Dimensions (in)	Weight Nominal lb/ft	Tolerance (+/- %)	Minimum Yield Strength (psi)
Line posts	Grade 1 Pipe	2.375	3.65	10	30,000
	Grade 2 Pipe	2.375	3.12	10	50,000
	C-Section	2.250 × 1.700	2.78	10	50,000
	H-Section	2.250 × 1.700	3.26	10	50,000
End, corner pull posts	Grade 1 Pipe	2.875	5.79	10	30,000
	Grade 2 Pipe	2.875	4.64	10	50,000
Gate Posts, for nominal width of gate (single or one leaf of Double):					
Up to 6 ft incl.	Grade 1 Pipe	2.875	5.79	10	30,000
	Grade 2 Pipe	2.875	4.64	10	50,000
Over 6 to 13 ft incl.	Grade 1 Pipe	4.000	9.11	10	30,000
	Grade 2 Pipe	4.000	6.56	10	50,000
Over 13 to 18 feet incl.	Grade 1 Pipe	6.625	18.97	10	30,000
Over 18 feet	Round	8.625	28.58	10	30,000
Gate frames	Grade 1 Pipe	1.900	2.72	10	30,000
	Grade 2 Pipe	1.900	2.28	10	50,000
Top rails, ^[1] post braces	Grade 1 Pipe	1.660	2.27	10	30,000
	Grade 2 Pipe	1.660	1.84	10	50,000
	Roll-form	1.6250 × 1.250	1.35	10	50,000
	Round tubing	1.660	1.38	10	50,000
[1] For specified tension wire, provide 0.177 in diameter.					

710.03

TABLE 710.03-1M STEEL POSTS, GATE FRAMES, POST BRACES, AND TOP RAILS

Usage – nominal fence height 1.8 m or less	Section Thickness	Outside Diameter or Dimensions (mm)	Weight Nominal (kg/m)	Minimum Tolerance (+/- %)	Yield Strength (MPa)
Line posts	Grade 1 Pipe	60	5.4	10	209
	Grade 2 Pipe	60	4.6	10	345
	C-Section	57 × 43	4.1	10	345
	H-Section	57 × 43	4.9	10	345
End, corner pull posts	Grade 1 Pipe	73	8.6	10	209
	Grade 2 Pipe	73.00	6.9	10	345
Gate Posts, for nominal width of gate (single or one leaf of Double):					
Up to 1.8 m incl	Grade 1 Pipe	73.00	8.6	10	209
	Grade 2 Pipe	73.00	6.9	10	345
Over 1.8 to 4 m incl.	Grade 1 Pipe	102.00	13.6	10	209
	Grade 2 Pipe	102.00	9.8	10	345
Over 4 to 5.5 m incl.	Grade 1 Pipe	168.00	28.2	10	209
Over 5.5 m	Round	219	42.5	10	209
Gate frames	Grade 1 Pipe	48	4.0	10	209
	Grade 2 Pipe	48	3.4	10	345
Top rails, ^[1] post braces	Grade 1 Pipe	42	3.4	10	209
	Grade 2 Pipe	42	2.7	10	345
	Roll-form	41 × 32	2.0	10	345
	Round tubing	42	2.1	10	345
[1] For specified tension wire, provide 4.5 mm diameter.					

Provide ornamental cap post tops made of steel, malleable iron or cast iron. Provide them with a hole suitable for through passage of the top rail. Provide a snug fit to the post, attach securely to the post, and exclude moisture from tubular posts. Provide swing type gates complete with latches, stops, keepers, hinges, locks, and fabric. Cover them with fabric matching the fence. Provide hinges of adequate strength to support the gate and do not twist or turn under action of the gate. Locate plunger bar type latches at the full gate height to engage the gate stop. The Contractor may use forked latches for single gates less than 10 feet (3 m) wide. Provide lockable latches. Provide stops consisting of a flush plate with anchor placed in concrete to engage the plunger bar of the latch. The Contractor may use other approved types of stops for single gates less than (10 feet) 3 m wide. Use keepers for securing and supporting the free end of the gate in the open position.

Provide top rail couplings consisting of the outside sleeve type at least 6 inches (150 mm) long. Provide a minimum of 20 percent of the coupling with an internal heavy spring to take up expansion and contraction.

Provide gate frames assembled by welding, using properly designed, formed sheet, or sandcast fittings. Cover the gates with fabric matching the fence.

Provide offset type hinges. Provide galvanized latches, stops, and keepers made of malleable iron, except the Contractor may provide plunger bars of galvanized tubular or bar steel in accordance with Section 6.2.

Provide top rails in lengths not less than 18 feet (5.5 m).

Provide flat stretcher bars in 3/4 × 1/4-inch (19 × 6 mm) sections.

Provide self-centering outside rail couplings 6 inches (150 mm) long.

Provide tie wire having a 0.148-inch (3.7 mm) minimum diameter and meeting an aluminum alloy.

Provide wrought or cast turnbuckles.

Provide truss and brace rods with an 3/8-inch (9.5 mm) outside diameter or equivalent cross-section.

Provide beveled brace bands in 1 × 1/8-inch (25 × 3 mm) section.

Provide bolts with an anodic coating at least 2 mil (5 μm) in thickness, chromate sealed.

11.1 Provide the size of the fabric conforming to 0.148-inch (3.7 mm) nominal diameter of coated wire, 2-inch (50 mm) mesh.

14.1 Table 8. Provide Type I Zinc-Coated Steel Chain Link Fabric having Class D weight of coating.

15.5 Provide the vinyl covering of a uniform medium green color.

19.1 Perform inspection at the project site.

32.2 Does not apply.

32.3.3.2 Increase the minimum weight of interior coating to an average of 0.9 ounces per square foot (275 g/m²) and not less than 0.8 ounces per square foot (244 g/m²) on an individual specimen.

TABLE 710.03-2 DIAMETERS OR PLAIN END, SCHEDULE 40 ALUMINUM ALLOY PIPE

		Nominal Pipe Size	
Material		(in)	(mm)
Brace rails and top rails		1 1/4	32
Gate frames and rail couplings		1 1/2	40
Line posts		2	50
End and corner posts		2 1/2	65
Gate posts single or one leaf of double:			
Gate opening			
(ft)	(m)	(in)	(mm)
To 6	To 1.8	2 1/2	65
Over 6 to 12	Over 1.8 to 3.7	3 1/2	90
Over 12 to 18	Over 3.7 to 5.5	6	150
Over 18 to 32	Over 5.5 to 9.8	8	200

Use the weights and dimensions as specified in ANSI H 35.2.

The Contractor may substitute an 8'8" line post in lieu of the line post shown on standard drawings Chain Link Fence 1.1, 7-28-00 and Walk Gates F-3.2, 7-28-00.

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Reduce the 4'-0" depth as necessary to accommodate the shorter posts. Use all other dimensions shown in the standard drawings

Provide certified material in accordance with ODOT Supplement 1067.

710.06 Deep Beam Rail. Provide deep beam rail in accordance with AASHTO M 180, Type II, Class A, with the following modifications:

5.1 Perform inspection at the project site.

5.2.1 If a field check of coating thickness shows insufficient coating thickness or shows insufficient coating weight, sample and test the guardrail.

9.1.2 The minimum check limits for both triple and single-spot tests apply.

Provide certified material in accordance with ODOT Supplement 1042.

710.09 Wire Rope Rail. Provide wire rope rail in accordance with AASHTO M 30, Class A, Type I rope, with the following modification:

9 Perform inspection at the project site.

Obtain random samples from material delivered to the project site or at other locations designated by the Laboratory.

710.11 Fence Posts and Braces. Provide round wood posts conforming to 710.12 and 710.14. Provide sound, straight dimension timber, posts, and lumber for braces and stream crossings, free from unsound or loose knots, splits and shakes, and treated in accordance with 712.06.

Provide steel line posts in accordance with ASTM A 702, with the following modifications:

5.6.2 Use fasteners or clamps having a 0.120-inch (3 mm) diameter and galvanized in accordance with ASTM A 116, Type Z, Class 3.

5.6.1 Supply each post with a sufficient number of fasteners or clamps.

6.2 Provide the designated post lengths.

7.1 Provide galvanized line posts and anchors in accordance with Section 711.02.

7.2 Delete.

9 Perform sampling in accordance with 712.06.

Provide certified material in accordance with ODOT Supplement 1067.

710.12 Square-Sawed and Round Guardrail Posts. Provide pressure treated square-sawed and round guardrail posts in accordance with 710.14 and 712.06. Cut posts from growing timbers free from unsound or loose knots and rot and from injurious or excessive shake, and season checks that exceed 1/4 inch (6 mm) in width.

Provide round posts 8 ± 1 inch (200 ± 25 mm) in diameter with a uniform taper. Ensure the sweep no greater than 1 inch (25 mm) for the length of the post. Peel round posts their entire length, removing all outer and inner bark and leather fiber by shaving the surface. Trim knots even with the post, and saw both ends of the post square.

Provide square sawed posts free from injurious cross grain and sapwood. Sawed posts may contain a limited number of sound knots not exceeding 2 inches (50 mm) in diameter. Use sawed posts from wane above the ground line. Limit the wane below the ground line to two adjacent corners not exceeding 1 1/2 inches (38 mm) measured along the wane.

Provide certified material in accordance with ODOT Supplement 1072.

710.14 Pressure Treated Guardrail and Fence Posts, Braces, and Blocks. Provide pressure treated guardrail and fence posts, braces, and blocks in accordance with AASHTO M 168 and 710.11, 710.12, and 712.06.

Provide certified material in accordance with ODOT Supplements 1042 and 1072.

710.15 Steel Guardrail Posts. Provide steel guardrail posts in the sections and lengths as specified, made of copper bearing steel if specified. Provide steel in accordance with ASTM A 36/A 36M. Furnish galvanized posts in accordance with 711.02.

Provide certified material in accordance with ODOT Supplement 1042.

710.16 Guard Posts. Provide pressure treated wood posts in accordance with Section 710.14. Provide posts either 5 × 6-inch (125 × 150 mm) sawed square or 5 1/2-inch + 1/2-inch (138 mm) diameter round when measured 30 inches (0.75 m) from the top. Provide posts 5 feet, 3 inches (1.6 m) in length embedded with 30 inches (0.75 m) of post remaining exposed. Provide the center-to-center spacing of 6 feet (1.8 m) intervals, unless otherwise shown on the plans.

Provide certified material in accordance with ODOT Supplement 1042.