

SECTION 028340
CHAIN LINK SECURITY FENCE

1. DESCRIPTION

This specification shall govern all work and materials required for providing chain link security fence for this project.

2. MATERIALS

Wire Fabric fencing shall be 9-gauge steel with a minimum tensile strength of 80,000 psi. Mesh size shall be 2". Top edge of fabric shall be twisted and barbed selvage on 6' height fencing and shall be knuckled selvage on 4' height fencing. Bottom edge of all fencing shall be twisted and barbed.

Tie clips of 6-gauge steel shall be furnished in sufficient quantity to fasten fabric to top tension wire or to top rail at 24" intervals. Ties shall be furnished to fasten the fabric to bottom tension wire at 24" intervals. The fabric shall be tied to line posts at 15" intervals.

Line Posts shall be provided at a maximum spacing of 10' and be of the following sizes:

<u>Fabric Height</u>	<u>Pipe Size</u>	<u>H-Beam Section</u>		<u>Embedment</u>	
		<u>Size</u>	<u>Wt./Ft.</u>	<u>Size</u>	<u>Length</u>
4'	1.90" O.D.	2.72#	1.875" x 1.625"	2.70#	24"
6'	2.375" O.D.	3.65#	2.25" x 1.95"	4.10#	30"

Corner Posts and End Post shall be of the following sizes:

<u>Fabric Height</u>	<u>Pipe Section Size</u>	<u>Embedment Length</u>	
			<u>Wt./Ft.</u>
4'	2.375" O.D.	3.65#	30"
6'	2.875" O.D.	5.79#	42"

Gate Posts shall be of the following sizes:

<u>Gate Leaf</u>	<u>Pipe Section Size</u>	<u>Embedment Length</u>	
			<u>Wt./Ft.</u>
Up to 6'	2.875" O.D.	5.79#	36"
6' to 13'.	4.0 " O.D.	9.10#	42"
13' to 18'	6.625" O.D.	18.97#	48"

Post caps for pipe sections shall be designed to exclude all moisture. Where barbed wire is specified, extension arms shall be integral with post caps. Where top rail is specified, post caps shall have an opening for top rail. All posts caps shall have a 2" skirt for rigidity.

Top rail, where called for, shall be 1.625" O.D. steel pipe weighing 2.27#/foot. Top rail shall be furnished in random lengths not less than 18' per section and shall be joined with outside sleeve, steel couplings not less than 6" long and having a wall thickness of not less than 0.70". Couplings shall be designed to allow for expansion movement of the top rail.

Tension wire for top finish, where no top rail is specified, shall be 7-gauge high carbon steel wire. Tension wire shall be furnished for bottom edge of all fence fabric.

Trussed bracing shall be furnished for each panel adjacent to a terminal, pull, corner, or gatepost. Compression member shall be 1.625" O.D. pipe as specified for top rail material. Tension members shall be 3/8" diameter steel rods with turnbuckles.

For 6' fences with top tension wire, braced panels shall consist of horizontal pipe brace, located approximately 4" below top of fabric, a diagonal pipe brace, attached at the midpoint of the terminal post and at the bottom of the adjacent line post, and a truss rod, attached to the top of the adjacent line post, extending diagonally to the bottom of the terminal post.

For 6' fences with top rail, braced panels shall consist of a horizontal pipe brace, midway between top and bottom of fence fabric, with a truss rod expending from midpoint of the line post diagonally to bottom of terminal post.

Four-foot fences with top rail shall be braced with a truss rod connected to the bottom of the terminal post and extending to top of adjacent line posts.

Four-foot fences without top rail shall have a horizontal brace pipe at the top of adjacent line posts.

Four-foot fences without top rail shall have a horizontal brace pipe at the top of the fabric and a diagonal truss rod installed as described above.

Gates shall be fabricated from 1.90" O.D. pipe weighing 2.72#/foot. Fabric on gates shall be the same as that specified for fencing. The following accessories shall be furnished for each gate:

Corner and tee fittings of malleable iron or pressed steel having means for attaching diagonal bracing members.

Hinges of malleable iron providing for full 180 degree swing with bottom hinges to be ball and socket type.

Diagonal braces consisting of 3/8" diameter truss rods with turnbuckles, two to each

gate frame. Vehicle gates shall have vertical 1.90" O.D. pipe brace at center of each gate leaf.

Latches for single gates shall have a single fork latch with padlock eye; double leaf gates shall have two fork latches mounted on center plunger rod with padlock eye.

Hold backs shall be provided for each leaf of vehicular gates, employing a semi-automatic hold back catch to be anchored at least 12" into a 12" diameter by 24" deep concrete footing.

A malleable iron center rest, designed to receive the plunger rod, to be anchored at least 12" into a 12" diameter by 24" deep concrete footing, shall be provided for all double leaf gates.

The top of all gate frames shall align with the fencing top rail. Vehicular gates shall be 4" greater in overall height than the adjacent fencing so as to extend to within 2" of pavement between 6" curbs, if curbs are designated on the plans.

Barbed wire, where specified, shall be 12-gauge with barbs spaced approximately 5" apart. Three strands of barbed wire will be required where barbed wire top is specified.

Barbed wire support arms shall be at an angle of 45 degrees from vertical and shall have clips for attaching 3 strands of barbed wire. Each support arm shall be of sufficient strength to support a 200 lb. weight applied at the outer strand of barbed wire.

Stretcher bars shall not be less than 3/16" by 3/4" flat steel and not more than 2" shorter than the fabric height. One stretcher bar shall be provided for each gate and end post. Two stretcher bars shall be provided for each corner and pull posts. Stretcher bars shall be attached to terminal posts with 1" x 1/8" flat steel bands with 3/8" carriage bolts at intervals not exceeding 15".

Miscellaneous fittings and fasteners shall be furnished in sufficient quantities to erect all fencing materials in a proper manner.

Approval of fence materials shall be obtained from the OAR prior to erection.

Galvanizing and Aluminum Coating. All material used in "Chain Link Security Fence" shall be hot dip zinc coated as specified by the following, except that the fabric may be aluminum coated:

All posts and pipe: ASTM Designation: A 120 (1.8 oz/sf).

All H-beam sections: ASTM Designation: A 123 (2.0 oz/sf).

Fence fabric: ASTM Designation: A 392, Class 1 (1.2 oz/sf) or ASTM Designation: A 491 (0.40 oz/sf).

Tension wire, barbed wire: ASTM Designation: A 121, Class III (0.80 oz/sf).

Post caps, stretcher bars, miscellaneous fittings: ASTM Designation: A 153.

Weight of zinc coating for all items shall be determined in accordance with ASTM Test Designation: A 90 except for core wire which shall have a galvanized coating weighing not less than 0.35 ounces of zinc per square foot. Field welds and cuts shall be touched-up with an approved zinc coating.

3. CONSTRUCTION METHODS

Clearing and Grading. The Contractor shall perform all clearing of brush, rocks and debris which may be necessary for the installation of this fencing. The OAR will approve the staked locations for corner posts and terminal posts in this installation. The fencing panels between corner and terminal posts shall generally follow the finished ground elevations. However, the Contractor shall grade off minor irregularities in the path of the fencing as necessary to limit the variation of grade under the bottom edge of fence fabric to a distance of not more than six inches and not less than two inches to the ground.

Post Spacing. Maximum spacing for line posts shall be 10 feet 0 inches. Pull posts shall be located not more than 500' apart and at each change in direction exceeding 20 degrees, both horizontally and vertically. Runs of fencing over 500' but less than 1,000' shall have a pull post in the center of the run.

Postholes. Holes for concrete footings for all posts shall be drilled to the dimensions listed in the following tables:

Holes for Line and End Posts

<u>Type Post</u>	<u>Fabric Height</u>	<u>Min.Hole Diameter</u>	<u>Min.Hole Depth</u>	<u>Post Embedment</u>
Line	4'	9"	30"	24"
Line	6"	10"	36"	30"
End	4'	12"	36"	30"
End	6'	12"	48"	42"

Holes for Gate Posts

<u>Gate Post Size</u>	<u>Min. Hole Diameter</u>	<u>Min. Hole Depth</u>	<u>Post Embedment</u>
2.875" O.D. x 5.79#	12"	42"	36"
4" O.D. x 9.10#	18"	48"	42"
6.625" O.D. x 18.97#	18"	54"	48"

Where solid rock is encountered without an overburden of soil, line posts shall be set a minimum depth of 12", and end, corner, gate and pull posts a minimum of 18" into the solid rock. The hole shall have a minimum diameter one inch greater than the largest dimension of the post section to be set. After the post is set and plumbed, the hole shall be filled with grout consisting of one part Portland cement and three parts clean, well-graded sand. Other grouting materials may be used if approved or specified by the Engineer. The grout shall be thoroughly worked into the hole so as to leave no voids. The grout shall be crowned to carry water from the post.

Where solid rock is covered by an overburden of soil or loose rock, the posts shall be set to the full depth shown in Table above unless the penetration into solid rock reaches the minimum depths specified above, in which case, the depth of penetration may be terminated. Concrete footings shall be constructed from the solid rock to the top of the ground. Grouting will be required on the portion of the post in solid rock.

Excavated material from footings shall be removed from the job site by the Contractor.

Concrete for Footings. Concrete for footings shall be Class "B" concrete in accordance with Section 030020 "Portland Cement Concrete", unless otherwise specified on plans. All concrete footings shall be cast up to finish grade and crowned 2" to shed water. Excess concrete not used in the footings, and any other construction debris, shall be removed from the site.

Fabric Erection. The fence fabric shall be erected by securing one end and applying sufficient tension to the other end to remove all slack before making attachments. The fabric shall be cut and each span shall be attached independently at all corner posts and pull posts. Fastening to end, pull, corner and gateposts shall be with stretcher bars which shall be secured to the posts with stretcher bar bands at intervals not exceeding 15". Fence fabric shall generally follow the finished contour of the site with the bottom edge of fabric located 2" above the grade. In uneven areas, the ground shall be graded so that the maximum distance between bottom of fabric and ground is limited to 6".

Electric grounds. Grounding rods shall be at least 5/8" diameter by 8' long "copperweld" rods driven or drilled into the soil so that the top of the rod is approximately 6" below grade. A No. 6 solid copper conductor shall be clamped to the ground rod and the bottom tension wire of the fence with cast bronze clamps with bronze or stainless steel bolts and washers. Each 1,000' of fence shall be provided with a ground located near the center of the run. At least one electrical ground shall be

installed for each fenced closure. A ground shall be provided directly under the point where a power line passes over the fence.

4. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, chain link security fence shall be measured by the linear foot. Measurement shall include but not be limited to furnishing and erecting all fence materials, gates, caps, concrete, ground wires, and cleanup. Payment shall be made at the unit price bid and shall fully compensate the Contractor for all materials required, all labor, all tools, all equipment and all other incidentals required to complete the work as shown on the contract drawings and as specified herein.