

**828 - FENCING**

**SECTION 828**

**FENCING**

**828.1 DESCRIPTION**

Construct the designated type of fence and gates as shown in the Contract Documents.

**BID ITEMS**

**UNITS**

Fence (*) (**) (***)	Linear Foot
Fence (*) (Temporary)	Linear Foot
Fence (*) (Removal and Resetting)	Linear Foot
Fence (Removal of Existing)	Linear Foot
Gate (*) (**)	Each
Posts (Corner) (*)	Each
Posts (End) (*)	Each
Posts (Pull) (*)	Each
Floodgates	Each
*Barbed Wire, Chain Link, Single Wire Cable Woven Wire (Type A, Type B or Type A or B) or other type specified in the Contract Documents.	
** Size, when necessary.	
*** Special	

**828.2 MATERIALS**

Provide materials that comply with the applicable requirements.

Woven Wire Fence Fabric .....	<b>DIVISION 1600</b>
Chain Link Fence Fabric .....	<b>DIVISION 1600</b>
Barbed Wire .....	<b>DIVISION 1600</b>
Steel Posts and Braces .....	<b>DIVISION 1600</b>
Wood Posts .....	<b>DIVISION 2300</b>
Preservative Treatment for Timber .....	<b>DIVISION 2300</b>
Gates .....	<b>DIVISION 1600</b>
Tension Wire .....	<b>DIVISION 1600</b>
Fittings .....	<b>DIVISION 1600</b>
Wire Cable and Fittings for Highway Fence .....	<b>DIVISION 1600</b>
Floodgates .....	<b>DIVISION 1600</b>
Concrete and Grout .....	<b>SECTIONS 401 &amp; 402</b>
Aggregates for Concrete Not On Grade .....	<b>SECTION 1102</b>

When designated in the Contract Documents, use metal "T" section commercial grade posts for barbed wire fence weighing a minimum of 1 1/8 pounds per foot after galvanizing.

Use material for temporary fence meeting recognized industry standards. Temporary fence material may have been previously used. The Engineer will approve the temporary fencing materials on the basis of condition and compliance with dimensional requirements.

**828.3 CONSTRUCTION REQUIREMENTS**

**a. General.** Confine activities and operations to the area immediately adjacent to the right-of-way lines and within the highway right-of-way or as shown in the Contract Documents. The Contractor is responsible for satisfactory arrangements for permits, as required, from adjacent property owners.

When the Contractor's operations create the need for temporary fencing, provide and install temporary fencing and appurtenances until such time that the permanent fence is in place (or until the temporary fence is no longer required). At the discretion of the Engineer, temporary fencing may be erected without concrete footings,

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pull posts, corner posts, etc. Remove the temporary fencing and appurtenances from the project site, when directed by the Engineer. Temporary fencing materials will remain the property of the Contractor.

(1) Clearing. When necessary, clear the path of the fence line.

(2) Trench Excavation. When necessary, excavate a trench to line and grade in areas of irregular ground to secure clearance between the ground line and the bottom of the fence fabric, or to permit placing steel fence wire below the bottom of the fence fabric at stream crossings. In areas where rock is encountered, excavate the rock as necessary to the required line and grade. Backfill any excavation of rock below the required grade with suitable materials as directed by the Engineer. Construct trenches to provide proper drainage. In general, the bottom of the fence will follow the contour of the ground according to standard industry practice in constructing fence of the types specified.

**b. Concrete Footings.** When required, construct footings of commercial grade concrete according to the Contract Documents.

Volumetric proportioning and hand mixing of concrete is permitted for concrete footings where small quantities are required.

Extend the top of the footing slightly above the ground line and steel trowel to a smooth finish with a slope to drain away from the post. Center posts, braces and other units in their footings. Set the posts and braces in advance of placing the fence to allow the concrete time to obtain its strength.

**c. Posts Set in Rock.** Where rock occurs within the required depth to which fence posts are to be erected, drill a hole of a diameter slightly larger than the largest dimension of the post in the rock and grout in the posts. When shown in the Contract Documents, cast in place the concrete footing as specified in **subsection 828.3b.**, between the top of rock and the required grade. At line posts, where top of rock is 8 inches or less below the required grade, remove the anchor plate. At all line posts, backfill the excavation above the top of rock with excavation materials placed in 4 to 6-inch layers. Thoroughly tamp each layer in place.

**d. Structure Terminals.** Place structure terminal assemblies at all stock passes, crossroad underpasses or overpasses and major drainage structures as shown in the Contract Documents.

**e. Floodgates and Channel Crossings.** Construct floodgates and channel crossings as shown in the Contract Documents.

**f. Intermediate or Line Posts.** Erect each post plumb, and horizontally line up all posts between horizontal angle points with no perceptible variation. Erect with line post spacing as uniform as practicable under local conditions, with maximum spacing as shown in the Contract Documents and a tolerance of minus 2 feet.

**g. Pull Posts.** Construct pull post assemblies (to the approximate spacing shown) in straight runs and at each vertical angle point as described in the Contract Documents.

**h. Corner Posts.** Place corner post assemblies at all horizontal angle points, and erect to comply with the measurement shown in the Contract Documents.

**i. End Posts.** Construct end post assemblies in the line of the fence at all terminal points. When gates and flood gates are required, use end posts to attach the gate or flood gate.

**j. Identification Signs.** Provide and place identification signs as shown in the Contract Documents.

**k. Erection of Gates.** Provide all materials necessary to complete the installation of pedestrian and vehicular gates as shown in the Contract Documents.

Carefully align all gates with posts vertical. Tightly assemble clamps used for attaching hardware. Construct the bottom of each gate 3 to 5 inches above the ground when closed, and to clear the ground by a minimum of 3 inches at all points in its swing. Modify the existing grade within the area of swing to meet this requirement, as directed by the Engineer. Direction of swing of gates will be shown in the Contract Documents. Install all gate stops as shown in the Contract Documents. For all gates, provide stops with latches, or other approved means for holding gates open, and place to prevent damage to the gate or fence by over-swing. Provide stops to arrest the swing of a closed gate at the centerline of the fence.

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**l. Removal of Existing Fence.** Remove the existing fence and store at locations as directed by the Engineer. Reset existing fence to be removed and reset, as shown in the Contract Documents. Provide all new materials necessary for resetting fence.

**m. Erection of Woven Fence.** Unless shown otherwise in the Contract Documents, either type of woven wire fence shown may be provided, but only one type may be used on a project.

Place the bottom of the fabric of woven wire fence a nominal distance of 3 inches above the ground line. However, over irregular ground, a clearance of 1 to 6 inches for a distance less than 8 feet is permitted. Perform any necessary excavation and backfilling required to comply as specified in **subsection 828.3a.(2)**.

Set all metal end, corner, pull and brace posts and all braces in concrete footings as shown in the Contract Documents. The dimensions of the footings may be varied as permitted by the Engineer, but shall provide an equal volume of concrete. Except where rock is encountered, set or drive intermediate or line posts into the ground. Provide metal posts with an approved plate or other anchor device to hold the post plumb and in proper alignment. The plate or anchor shall be satisfactorily welded or riveted (not less than 2 rivets) to the post. Wood posts may be driven or set in pre-bored holds. Remove any posts damaged by driving.

After posts are permanently positioned and concrete footings are fully set, place fabric by securing or fastening one end and applying sufficient tension to remove all slack before making permanent attachments. Fasten the lateral wires to end, corner and pull posts by wrapping the wires around the posts and tying the wire back on itself with a minimum of 5 twists wrapped tightly. Perform tying by using tools designed for the purpose according to the fence manufacturer's recommendation.

Apply the tension for stretching the fence by use of mechanical fence stretchers and with single wire stretchers, according to the fence manufacturer's recommendations. Securely make all splices in the fabric according to the fence manufacturer's recommendations, and using tools designed for that purpose.

Fasten fence fabric to steel intermediate or line posts with ties or clamps, and to wood posts with staples at the bottom and top 2 wires and other alternate intermediate lateral wires. Where the design of the line post incorporates satisfactory provision for supporting and securing the fabric wire to the post, the Engineer may eliminate tie wires or clamps.

**n. Erection of Chain Link Fence.** Set the posts sufficiently in advance of the placing of the fabric to allow the concrete time to obtain its design strength. Set the bottom of the fabric 3 inches above the finished ground line. Fasten the fabric to the tension wires as shown in the Contract Documents.

(1) Post Spacing and Setting. Set posts with a maximum spacing of 10 feet and set a minimum of 2 ½ feet below the finished surface of the ground in concrete footings as shown in the Contract Documents. Construct the concrete footings of a size and shape shown in the Contract Documents.

(2) Fabric bands with fasteners. Fasten fabric to line posts with aluminum or galvanized fabric bands spaced approximately 14 inches apart. Securely fasten the fabric to the end posts by approved type metal fasteners.

**o. Erection of Barbed Wire Fence.** Erect the fence as shown in the Contract Documents.

For intermediate or line posts, use either wood or metal posts of the type shown in the Contract Documents, but only one type may be used on the project,

Excavate holes for wooden posts on line and to the depth shown in the Contract Documents, and of sufficient size to permit adequate compaction of the backfill around the post.

Set corner posts and support posts, and securely brace and wire before setting the intermediate posts. Space the intermediate posts equal distances apart, 13 ½ feet maximum. Set the posts plumb, firm and true to designated line and grade. If not set in concrete, place the backfill around the posts in thin layers and thoroughly compact.

If metal posts are used for the intermediate posts, drive with an approved mechanical device to the depth shown in the Contract Documents.

Use brace wire consisting of 2 complete loops of No. 9 smooth, galvanized wire. Twist the loops both above and below the brace post until tight.

Draw barbed wire taut with an approved mechanical device and securely fasten to each post with a minimum of 1 fence staple or approved wire clip. Loop the wire around the end and corner posts, and fasten with sufficient staples to anchor the wire securely.

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**p. Erection of Single Wire Cable Fence.** Construct single wire cable fence as shown in the Contract Documents. Set all required posts as shown in the Contract Documents by driving or drilling and backfilling. Use either metal or wood posts, but only one type may be used on the project

**q. Electrical Grounds.** Immediately below where a power line crosses a fence, ground the fence with a galvanized or copper coated rod, 8 feet long and a minimum of  $\frac{5}{8}$  inch in diameter, driven vertically until the top is approximately 6 inches below the top of ground. Braze or attach a No. 6 solid copper conductor with an approved clamp to the rod and to the fence so each element of the fence is grounded. Install the ground rod immediately below the point of crossing.

**r. Erection of Chain Link Fence (Special).** Erect the Chain Link Fence (Special) as shown in the Contract Documents.

### 828.4 MEASUREMENT AND PAYMENT

The Engineer will measure various sections of fence, fence to be removed and fence to be removed and reset by the linear foot from center to center of terminal posts, excluding gate length.

The Engineer will measure single wire cable fence by the linear foot, except no measurement will be made for corner posts and end posts for this type of fence.

The Engineer will measure each Post (Corner), Post (Pull) and Post (End). Gate and floodgate posts required will be measured as Post (End).

The Engineer will measure temporary fencing including appurtenances by the linear foot when shown in the Contract Documents or directed by the Engineer. The Engineer will not measure temporary fencing and appurtenances necessitated by the Contractor's operations.

The Engineer will not measure clearing, excavation, backfill, drilling of rock, electrical grounds, structure terminals, channel crossing and line posts for payment. These items are subsidiary to the various fencing items in the Contract Documents.

Payment for various types of "Fence", "Fence (Temporary)", "Fence (Removal and Resetting)", "Fence (Removal of Existing)", "Gates", "Posts (Corner)", "Posts (End)", "Posts (Pull)", and "Floodgates" at the contract unit prices is full compensation for the specified work.

Quantities shown in the Contract Documents for temporary fencing are for estimating purposes only. No adjustment in the contract unit price will be made regardless of the amount of underruns or overruns.