

**641.4.01 Limits**

General Provisions 101 through 150.

**641.5 Payment**

Guardrail, of the type specified, complete in place including posts, offset blocks, and hardware will be paid for at the Contract Price per linear foot (meter).

Guardrail anchorage assembly will be paid for at the Contract Price per each assembly, complete in place.

All lengths of guardrail posts when shown in the Contract documents as a separate Pay Item will be paid for at the Contract Unit Price. Payment is full compensation for furnishing the posts, offset block, hardware, and Work to complete the Item.

For Projects that do not include grading as a Pay Item, payment for guardrail and guardrail anchorage systems on shoulders includes:

- Embankment material for shoulders as shown on the Standard Details or Plans
- Compacting embankment material for shoulders to the approximate density of the surrounding soils
- Removing existing vegetation and obstructions before placing the embankment
- Grassing the reconstructed area according to Section 700

Payment will not be increased or decreased when wood offset blocks are added to or substituted for steel or plastic offset blocks.

Payment will be made under:

Item No. 641	Guardrail, type_____	Per linear foot (meter)
Item No. 641	Double faced guardrail, type_____	Per linear foot (meter)
Item No. 641	Guardrail for bridges, type_____	Per linear foot (meter)
Item No. 641	Double guardrail for bridges, type_____	Per linear foot (meter)
Item No. 641	Guardrail, Type T, Modified offset block	Per linear foot (meter)
Item No. 641	Guardrail anchorage, type____,	Per each
Item No. 641	Guardrail posts (all lengths)	Per each

**641.5.01 Adjustments**

General Provisions 101 through 150.

**Section 643—Fence****643.1 General Description**

This work includes constructing fence and gates according to these Specifications where shown on the Plans or designated by the Engineer. Ensure that this work conforms with the lines and grades shown on the Plans. The fence types covered by these Specifications are:

- Chain-link
- Woven wire
- Barbed wire
- Field fence
- Barrier fence

**643.1.01 Definitions**

General Provisions 101 through 150.

**643.1.02 Related References****A. Standard Specifications**

Section 500—Concrete Structures

Section 645—Repair of Galvanized Coatings

Section 862—Wood Posts and Bracing

Section 863—Preservative Treatment of Timber Products

Section 894—Fencing

**B. Referenced Documents**

General Provisions 101 through 150.

**643.1.03 Submittals**

Furnish the Engineer, in duplicate, a materials certification for temporary barrier fence physical properties according to Section 106 of the Specifications.

**643.2 Materials**

Ensure that materials conform to the following Specifications:

<b>Material</b>	<b>Section</b>
Concrete (Class A or B)	500
Wood Fence Posts and Bracing	862.2.01
Metal Caps	862.2.01.A.5.
Preservative Treatment	863.2.01
Chain Link Fence (Fabric, Posts, Gates, and Accessories)	894.2.01
Woven Wire Fence (Fabric, Gates, and Posts)	894.2.02
Barbed Wire (including Posts)	894.2.03
Ground Rods and Connections	894.2.04
Field Fence	894.2.05

**A. Chain-Link Fence**

Use the fencing material shown in Subsection 894.2.01. Ensure that posts, fabric, wire, appurtenances, and gates when required, are the same or matching type for each Project, unless otherwise directed.

**B. Woven-Wire or Barbed-Wire Fences**

Use wood or steel post types as shown on the Plans. Ensure that each Project fence and post is the same type and shape, unless otherwise specified.

**C. Temporary Barrier Fence**

1. Use barrier fence fabricated from high-density polyethylene or polypropylene containing U.V. stabilizers
2. Ensure the barrier fence meets the following:
  - a) Is free of manufacturing flaws

b) Meets the following physical properties

Maximum Mesh Opening Size	1 3/4" (45 mm) x 2 1/8" (54 mm)
Roll Width	4 ft. (1.2 m)
Color	International Orange
Maximum Porosity	80%
Minimum Yield Strength (MD)	750 lb/ft (11 kN/m)

#### 643.2.01 Delivery, Storage, and Handling

Do not store barbed-wire, woven-wire fence fabric, steel posts, hardware, and other materials on the ground. Place them in floored buildings, on platforms, or on wooden timbers or poles. Ensure that the floors, platforms, or props are high enough to prevent the wire and steel posts from touching ground or surface water.

Wire or steel posts that are damaged from improper storage between fabrication and final erection will be rejected.

### 643.3 Construction Requirements

#### 643.3.01 Personnel

General Provisions 101 through 150.

#### 643.3.02 Equipment

General Provisions 101 through 150.

#### 643.3.03 Preparation

General Provisions 101 through 150.

#### 643.3.04 Fabrication

General Provisions 101 through 150.

#### 643.3.05 Construction

Construct fence (except for field fence) within the right-of-way line. Do not allow the permanent installation to encroach on adjacent property.

#### A. General Fencing Requirements

Follow these general requirements when placing the fence:

1. Construct the fence to follow the contour of the ground. Place the bottom of the fence fabric at least 1 in (25 mm) from the ground surface, but no more than 6 in. (150 mm).
2. Clear the fence line a maximum of 8 ft (2.4 m) wide and grade where necessary to provide a neat appearance.
3. When the ground profile in low areas changes abruptly, use longer posts to maintain the ground clearance. Stretch multiple strands of barbed wire on the posts with 6 in (150 mm) or less vertical clearances between strands of barbed wire.
4. Connect the existing cross fences to new fencing, except for obviously unserviceable fences.
5. Place corner or end posts, whichever is appropriate, at the junction with existing fences and fasten the wires in the new and existing fences to the posts.
6. Install corner or pull posts for new fencing without placing tension on existing fence posts. At structures, fasten new fencing to end posts to permit livestock to pass through or under the structure freely, unless otherwise directed or shown on the Plans.

#### B. Posts and Appurtenances

Follow these steps to install posts and appurtenances:

1. Place and install the posts as shown on the Plans. If the soil is Class I, II, III, or V, drive "C" and 2-3/8 in (60 mm) tube-type line posts for all fence types at least 3 ft (900 mm) deep instead of using concrete encasement.
2. Encase in concrete line posts installed in marshy or swampy areas (Class IV soils). Install posts in rock according to this subsection.
3. Encase the corner, end, and pull posts in concrete as shown on the Plans.

4. Replace posts damaged by driving. When posts are set in concrete, fill the entire hole around the post with Class A or B concrete.
5. Hand mix concrete for batches of  $1/2 \text{ yd}^3$  ( $0.5 \text{ m}^3$ ) or less. Firmly brace the posts and hold them in place until the concrete has set.
6. Ensure that the distance between the end, pull, and corner or angle post assemblies does not exceed the following:

For chain-link fence, straight line	500 ft (150 m)
For chain-link fence, curved line	250 ft *(75 m)
For woven-wire fabric	330 ft (100 m)
Field fence	330 ft (100 m)

7. On end, pull, and corner or angle post assemblies for woven-wire fence, add additional approach posts for greater stability when necessary or as directed by the Engineer.
8. Set posts placed on concrete walls, slabs, or solid rock in round holes 6 in (150 mm) deep or as indicated on the Plans.
9. Fill the space around the post with molten lead or a cement filler approved by the laboratory.
10. Repair the posts after cutting or drilling. Repair galvanized steel posts according to Section 645. Repair other metal posts according to the manufacturer's recommendations.
11. Treat timber posts and braces with a preservative coating of the type specified in Subsection 863.2.01.

#### C. Fence Erection

Install fence fabric or barbed wire when posts are set and braced, except when posts are set in concrete footings.

When posts are set in concrete footings, delay installing the fabric or wire to allow the concrete to cure at least 5 days. When barbed wire fence is required, install three strands unless otherwise indicated on the Plans.

#### D. Gates

Ensure that the gate assemblies are the length, height, and type designated on the Plans. Install the gate to provide a 180-degree swing.

Weld the gate frames into units. Properly coat them after welding according to Section 894.

Stretch fabric that matches the fence fabric taut over the gate frame. Provide gate assemblies with a positive-type locking device, padlock, and keys.

#### E. Electrical Ground

Wherever a power line carrying more than 600 volts passes over the fence, install a ground rod.

1. Install the ground rod at the nearest point directly below the point of crossing.
2. Where possible, drive the rod into the ground for a full 8 ft (2.4 m) of penetration.
  - a. In rocky soil, drive the rod slanted to provide 18 in (450 mm) of cover at the tip.
  - b. In solid rock, install two ground rods at the nearest post on each side of the power line crossing where soil conditions will permit.
3. Use clamps to attach a length of No. 6 AWG bare copper, 7-strand wire between the fence and the ground rod.

#### F. Trespassing on Private Property

To trespass on private property outside the right-of-way or easements provided on the Plans, obtain permission from the property owner for the intrusion.

Use field fence for replacing fence outside the right-of-way or for providing temporary fence at locations shown on the Plans or directed by the Engineer. Field fence is considered permanent unless it is specified as temporary.

#### G. Maintaining Livestock

Construct the fence to prevent livestock from escaping. Schedule fence removal and new fence installation to provide continuous security of the livestock. If security is not maintained and animals or property are damaged or lost, compensate the owner or make repairs at no cost to the Department. Replace or repair damaged existing fences.

## H. Temporary Barrier Fence

Install the barrier fence according to the manufacturer's instruction. Use suitable strength metal, wood, or composite posts. Ensure the posts are long enough to be embedded to a depth that will provide stability to the fence have sufficient rigidity to hold the fence in a vertical position.

The maximum post spacing is 10 ft (3 m). Attach the fence to the posts with nails, staples, or wire ties spaced every 6 in. (150 mm) along the posts. Do not allow the method of attachment to create a safety hazard.

At the completion of the project, or as directed by the Engineer, remove all barrier fence including posts and incidentals.

### 643.3.06 Quality Acceptance

Repair rusted wire or posts before Final Acceptance, or remove and replace with new material at the Contractor's expense. Do not replace the fence if rusting occurs as a result of ponding water after the fence is erected.

### 643.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

## 643.4 Measurement

Fence will be measured by the linear foot (meter) along the bottom of the fence, from the outside of end posts for each continuous run of fence. Measurement for payment includes posts, post assemblies, pull, corner, and gate posts, and gates unless gates are a separate Pay Item.

When gates are paid for separately they will be measured as complete Units of the type and size specified and installed.

Temporary barrier fence will be measured by the linear foot (meter) along the bottom of the fence outside of end posts for each continuous run of fence.

### 643.4.01 Limits

General Provisions 101 through 150.

## 643.5 Payment

The accepted quantities of fence, measured as indicated above, will be paid for at the Contract Unit Price per linear foot (meter) of the specified type and height of fence. Payment includes gates unless the gates are paid for separately.

The accepted quantity of gates, when listed as a separate Pay Item, will be paid for at the Contract Unit Price for each type and size of gate specified, complete in place, including posts and hardware, locks, keys, and other incidentals shown on the Plans.

Payment includes clearing and grubbing, grading, excavating, backfilling, disposing of surplus materials, and furnishing materials and incidentals such as molten lead or cement filler on concrete walls, slabs, or solid rock to complete the work.

When field fencing is temporary, payment includes removal. Materials salvaged from temporary field fence remain the Contractor's property.

The accepted quantities of temporary barrier fence measured as indicated above will be paid for at the Contract unit price per linear foot (meter) of fence. Payment to complete the item includes all necessary clearing, installation of fence including hardware and other incidentals, and removal of the fence. The barrier fence, posts, and all incidentals become the property of the Contractor upon removal.

Payment will be made under:

Item No. 643	Field fence, woven wire	Per linear foot (meter)
Item No. 643	Field fence, barbed wire (strand)	Per linear foot (meter)
Item No. 643	Field fence, special design	Per linear foot (meter)
Item No. 643	Chain-link fence (type ___), (height___) in (mm), wire gauge___	Per linear foot (meter)
Item No. 643	Chain-link fence (type ___), (height___) in (mm), wire gauge___, with extension arms and barbed wire	Per linear foot (meter)

Item No. 643	Woven-wire fence	Per linear foot (meter)
Item No. 643	Barbed-wire fence (strand)	Per linear foot (meter)
Item No. 643	Gate (fence type,____) (size____)	Per each
Item No. 643	Barrier fence, height,____ ft (m)	Per linear foot (meter)

**643.5.01 Adjustments**

General Provisions 101 through 150.

## **Section 645—Repair of Galvanized Coatings**

**645.1 General Description**

This work includes field repairing damaged galvanized coatings, except coatings on wire and chain-link wire fence.

When galvanized materials are welded, the work applies to the welded area and to the damaged areas adjacent to the weld. It does not apply to new materials deficient in coating.

**645.1.01 Definitions**

General Provisions 101 through 150.

**645.1.02 Related References****A. Standard Specifications**

Section 870—Paint

**B. Referenced Documents**

General Provisions 101 through 150.

**645.1.03 Submittals**

General Provisions 101 through 150.

**645.2 Materials**

Use material for repairing galvanized coatings that conforms to the following:

Material	Section
Galvanizing Repair Compound	870.2.05

**645.2.01 Delivery, Storage, and Handling**

General Provisions 101 through 150.

**645.3 Construction Requirements****645.3.01 Personnel**

General Provisions 101 through 150.

**645.3.02 Equipment**

General Provisions 101 through 150.

**645.3.03 Preparation**

Before applying repair compounds:

1. Clean the area of grease using an approved solvent recommended by the producer of the galvanizing repair compound.
2. Thoroughly brush the area with a stiff wire brush to remove dirt, loose galvanizing, welding slag, or other foreign material.