

**MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF AERONAUTICS - STANDARD SPECIFICATION
F-161
Wire Fence With Steel Posts
(Class C Fence)**

DESCRIPTION

1.1 This item covers the requirements for furnishing materials and constructing new wire fences and gates with steel posts in accordance with the details included herein and as shown on the plans. The class of fence to be erected will be Class C, woven wire fencing surmounted by two strands of barbed wire, as indicated on the plans and in the bid proposal.

may meet the physical requirements or rail steel ASTM A499 and the shapes galvanized in accordance with ASTM A123.

Miscellaneous hardware will be zinc-coated in conformance with ASTM A153.

The weight of zinc-coating per square foot of actual area will average not less than 2.0 ounces, and no individual specimen will show less than 1.8 ounces.

MATERIALS

2.1 Wire.

(a) Woven wire. Woven wire fence will be zinc or aluminum-coated, of the type, style and gauge shown on the plans. Zinc-coated wire will conform to ASTM A116, Class I. Aluminum-coated wire will conform to ASTM A584, Class I.

2.3 Concrete. Concrete will be of a commercial grade with a minimum 28-day compressive strength of 2500 psi. Testing may be waived if either the concrete is furnished by a reputable transit mix firm approved by the Engineer or when the concrete is mixed on the site.

When tests are waived, as heretofore mentioned, the concrete will be a standard 6 bag mix, with 1" maximum course aggregate, unless otherwise specified, and will have a slump range of 2-5 inches.

(b) Barbed Wire. Barbed wire will be 2-strand twisted steel of No. 12 ½ minimum wire gauge, with 4-point barbs of No. 14 minimum wire gauge at a nominal 5-inch spacing, and will conform to one of the following types and specifications:

CONSTRUCTION METHODS

<u>Type</u>	<u>Specification</u>
(a) zinc-coated	ASTM A121, Class 1
(b) copper-covered	Fed. Spec. RR-F-221, Type 1, Style 3
(c) aluminum-coated	ASTM A585, Class 1

3.1 General. The fence will be constructed in accordance with the details on the plans and as specified herein using new materials, and all work will be performed in a workmanlike manner satisfactory to the Engineer. Prior to the beginning of the work or upon the request of the Contractor, the Engineer will locate the position of the work by establishing and marking the property or fence line. When directed, the Contractor will span the opening below the fence with barbed wire fastened to stakes of the required length at locations of small natural swales or drainage ditches where it is not practical to conform the fence to the general contour of the ground surface. The new fence will be permanently tied to the terminals of existing fences whenever required by the Engineer. The finished fence will be plumb, taut, true to line and ground contour, and complete in every detail. When directed, the Contractor will stake down the woven wire fence at several points between posts.

(c) Bracing Wire. Bracing wire will be zinc or aluminum-coated steel, No. 9 wire gauge. Zinc-coated wire will conform to ASTM A116, Class 1. Aluminum-coated wire will conform to ASTM A584, Class 1.

When directed, in order to keep stock on adjoining property enclosed at all times, the Contractor will arrange the work so that construction of the new fence will immediately follow the removal of the existing fences. The length of unfenced section at any time will not exceed 300 feet or such a length that the stock can be kept in the proper field. The work will progress in this manner and at the close of the working day the newly constructed fence will be tied to the existing fence. Any openings in the fence will be guarded when stock is using the adjoining property.

2.2 Fence Posts, Gates, Rails, Braces, and Accessories. Gates, gate posts, and gate hardware will be specified under Specification F-162, Chain Link Fences, unless otherwise detailed and specified on the plans.

Other posts, braces, rails, and accessories will conform to Federal Specification RR-F-221 and will be zinc-coated, or steel for those shapes

3.2 Clearing Fence Line. The site of the fence will be sufficiently cleared of obstructions, and surface irregularities will be graded so that the fence will conform to the general contour of the ground. The fence line will be cleared to a minimum width of 5 feet on the outside and 10 feet on the airport side of the fence, or as specified on plans. This clearing will consist of the removal of all stumps, brush, rocks, trees, or other obstructions which will interfere with proper construction of the fence. Stumps within the cleared area of the fence line will be grubbed or excavated. The bottom of the fence will be placed a uniform distance above ground as specified in the plans. When shown on the plans or as directed by the Engineer, the existing fences which coincide with, or are in a position to interfere with, the new fence location will be removed by the Contractor as part of the construction work, unless such removal is listed as a separate item in the bid schedule. All holes remaining after post and stump removal will be refilled with suitable soil, gravel, or other material acceptable to the Engineer, and will be compacted properly with tampers.

The work will include the handling and disposal of all material cleared, of excess excavation and the removal of spoiled material regardless of the type, character, composition, or condition of such material encountered.

Clearing and grubbing of fence line will be incidental to the fence pay item.

3.3 Installing Posts. All posts will be spaced as shown on the plans. Corner, brace, anchor, end, and gate posts will be set in concrete bases as shown on the plans. The top of the base will be slightly above the ground surface, trowel finished, and sloped to drain. Holes of full depth and size for the concrete bases for posts will be provided even if blasting of rock or other obstructions is necessary. All line posts may be either driven or set in dug holes to a penetration of 3 feet. All post settings will be done carefully and to true alignment. Dirt removed for placing posts, anchor bars, flanges, etc., will be replaced, tamped, and leveled. When posts are driven, care will be exercised to prevent marring or buckling of the posts. Damaged posts will be replaced at the Contractor's expense. No extra compensation will be made for rock excavation. Rock excavation will not be grounds for an extension of time.

3.4 Bracing. All corner, anchor, end, and gate posts will be braced as shown on the plans. Anchor posts will be set at approximately 500-foot intervals and braced to the adjacent posts.

3.5 Installation Wire. All barbed wire and woven wire will be placed on the side of the posts away from the airport, or as directed, at the height indicated on the plans. The woven wire will be carefully stretched and hung without sag and with true alignment. Care will be taken not to stretch the wire so tightly that it will break in cold weather or pull up corner and brace posts. All horizontal wires will be fastened securely to each post by fasteners or clips designed for use with the posts furnished. The woven wire will be wrapped around end, corner, and gate posts, and the ends of all horizontal wires will be tied with snug, tight twists. The wire will be secured to prevent slipping up and down the post. Barbed wire strands will be stretched and each strand secured to each post to prevent slipping out of line or becoming loose. At end, corner, and gate posts the barbed wire will be securely wrapped and anchored once about the post from the outside and secured against slipping by tying the ends with snug, tight twists. However, on spans of less than 100 feet, both ends of the span need not be wrapped around the posts. The bottom wire of the woven wire fencing will clear the ground by not more than 4 inches or less than 1 inch at any place.

3.6 Splicing Wire. Splices in barbed and woven wire will be permitted if made with an approved galvanized bolt-clamp splice or a wire splice made as follows: The ends of each wire will be carried 3 inches past the splice tool and wrapped around the other wire for at least six turns in opposite directions. After the tool is removed, the space occupied by it will be closed by pulling the ends together. The unused ends of the wire will be cut close to make a neat, workmanlike job.

3.7 Installing Gates. Gates will be installed as specified under Specification F-162, Chain Link Fences, unless otherwise detailed and specified on the plans.

3.8 Existing Fence Connections. Wherever the new fence joins an existing fence, either at a corner or at the intersection of straight fence lines, a corner or anchor post will be set at the junction and braced and anchored the same as herein described for corner posts.

If the connection is made at other than the corner of the new fence, the last span of the old fence will contain a brace span.

3.9 Warning Signs. Warning signs, when specified will be of suitably enameled metal, of the size, type, material, wording, and color specified on the plans.

3.10 Cleaning Up. The Contractor will remove from the vicinity of the completed work all tools, buildings, equipment, etc., used during construction.

METHOD OF MEASUREMENT

4.1 Fences, Class C (Steel Posts), will be measured in place from outside to outside of end posts or corner posts and will be the length of fence actually constructed, except for the space occupied by the gates. Gates will normally be installed and measured under Specification F-162, Chain Link Fences.

Driveway gates and walkway gates will be measured in units for each gate installed and accepted.

BASIS OF PAYMENT

5.1 Payment will be made at the contract unit price per linear foot for Class C wire fence. This price will be full compensation for furnishing all materials and for all preparation, clearing and grubbing of fence line, erection, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made at the contract unit price per each for driveway or for walkway gates. This price will be full compensation for furnishing all materials and for all preparation, erection, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under the nomenclature and seven digit item number specified in the plans and proposal for each type of fence, or specifically detailed gate required per linear foot or per each, as applicable.

The first three digits of any item number for work included under the specification will be 161, i.e., 161XXXX.

TESTING AND MATERIAL REQUIREMENTSTest and Short Title

None

Material and Short Title

*RR-F-221	Wire
ASTM A116	Galvanized Wire Fence
ASTM A121	Galvanized Barbed Wire
ASTM A123	Hot Galvanized Coatings
ASTM A153	Galvanized Hardware
ASTM A499	Rail Steel Shapes
ASTM A584	Aluminum-Coated
ASTM A595	Aluminum-Coated

NOTE: Others as required by referenced specifications.

*** Federal Specifications**

**** American Wood Preservers Association**