

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF AERONAUTICS - STANDARD SPECIFICATION
F-162
Chain Link Fence

DESCRIPTION

1.1 This item covers the requirements for furnishing materials and constructing new chain link fences and gates in accordance with the details included herein and as shown on the plans and in the bid proposal.

with aluminum alloy fabric will be of aluminum alloy.

Galvanized steel pipe will conform to the requirements of ASTM A120, Schedule 40, except the hydrostatic testing requirement is waived. Galvanizing will be in accordance with ASTM A123.

MATERIALS

1.2 Fabric. The fabric will be woven with a 9-gauge wire in a 2-inch mesh and will be of the following types, as specified:

Acrylic-coated steel pipe will conform to the requirements of Federal Specification RR-F-191/3 for Class 1 steel pipe, Grade B.

Type 1. Galvanized steel fabric will conform to the requirements of ASTM A392, Class II.

The steel used in all structural shapes will conform to the requirements of ASTM A572, Grade 45, and will be galvanized in accordance with the requirements of ASTM A123.

Type 2. Aluminum-coated steel fabric will conform to the requirements of ASTM A491.

Roll formed sections will be fabricated from material meeting the requirements of ASTM A570, Grade 45, and will be galvanized in accordance with the requirements of ASTM A123.

Type 3. Aluminum alloy fabric will conform to the requirements of ASTM B211, alloy 6061-T94.

Aluminum alloy will conform to the requirements of ASTM B429, alloy 6063-T6, Schedule 40, for extruded pipe and tube.

Type 4. Polyvinyl chloride-coated steel will conform to the requirements of Federal Specification RR-F-191/1.

Aluminum alloy will conform to the requirements of ASTM B221, alloy 6063-T6, for extruded bar, shape, and tube.

2.2 Barbed Wire. Barbed wire will be 2 strand 12-1/2 gauge wire with 4 point barbs and will be of the following types, as specified:

Vinyl coated steel will conform to the requirements of Federal Specification RR-F-191/3.

Type A. Zinc coated barbed wire will conform to the requirements of ASTM A121, Class 3.

ASTM A123 specifies a zinc coating weight of not less than 2.0 ounces per square foot. Federal Specification RR-F-191/3 specifies a zinc coating weight of not less than 1.0 ounce per square foot for Grade B pipe with an external chromate coating of 30 micrograms per square inch and an acrylic coating of 0.0005 inches or greater.

Type B. Aluminum coated barbed wire will conform to the requirements of ASTM A585, Class II.

2.3 Posts, Rails and Braces. Posts, rails, and braces furnished for use in conjunction with zinc-coated steel fabric or with aluminum coated steel fabric will be of zinc-coated steel or acrylic-coated steel pipe, and those furnished for use in conjunction

The dimensions of the posts, rails, and braces will be in accordance with Tables 1 through VI of Federal Specification RR-F-191/3.

2.4 Gates. Gate frames will consist of galvanized steel pipe, acrylic-coated steel pipe or aluminum alloy pipe, and conform to the specifications for the same material under Section 2.3. The fabric will be of the same type material as used in the fence.

2.5 Wire Ties and Tension Wires. Wire fabric ties, wire ties, and tension wire for use in conjunction with a given type of fabric will be of the same material identified with the fabric type. The tension wire will be 7-gauge coiled spring wire, coated similarly to the respective wire fabric being used.

Wire fabric ties will be hog rings, aluminum wire, or galvanized steel wire not less than 9-gauge.

All material will conform to Federal Specification RR-F-191/4.

2.6 Miscellaneous Fittings and Hardware. Miscellaneous steel fittings and hardware for use with zinc-coated or aluminum-coated steel fabric will be of commercial grade steel or better quality, wrought or cast as appropriate to the article, and sufficient in strength to provide a balanced design when used in conjunction with fabric, posts, and wires of the quality specified herein. All steel fittings and hardware will be protected with zinc coating applied in conformance with ASTM A153. Miscellaneous aluminum fittings for use with aluminum alloy fabric will be wrought or cast aluminum alloy. Barbed wire support arms will withstand a load of 250 pounds (113 kg) applied vertically to the outermost end of the arm.

2.7 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 the materials are approved by the Engineer 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 coarse aggregate, unless otherwise specified, and will have a slump range of 2 - 5 inches.

2.8 Marking. Each roll of fabric will carry a tag

showing the kind of base metal (steel, aluminum, or aluminum alloy number), kind of coating, the gauge of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings will be identified as to manufacturer, kind of base metal (steel, aluminum alloy number), and kind of coating.

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

CONSTRUCTION METHOD

3.1 Clearing and Grubbing Fence Line. All trees, brush, stumps, logs, and other debris will be cleared and grubbed a minimum width of 5 feet on outside of fence and 10 feet on airport side of fence, or as specified on the plans. When fence is located along property line, the fence will be located 5 feet from property line.

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

3.2 Installing Posts. All posts will be set in concrete at the required dimension and depth and at the spacing shown on the plans.

The concrete will be thoroughly compacted around the posts by tamping or vibrating and will have a smooth finish slightly higher than the ground and sloped to drain away from the posts. All posts will be set plumb and to the required grade and alignment. No materials will be installed on the posts, nor will the posts be disturbed in any manner within 7 days after the individual post footing is completed.

Should rock be encountered at a depth less than the planned footing depth, a hole 2 inches (50mm) larger than the greatest dimension of the posts will be drilled to a depth of 12 inches (3000mm). After the posts are set the remainder of the drilled hole will be filled with grout, composed of one part Portland cement and two parts mortar sand. Any remaining space above the rock will be filled with concrete in the manner described above.

In lieu of drilling, the rock may be excavated to the

required footing depth. No extra compensation will be made for rock excavation.

3.3 Installing Top Rails. The top rail will be continuous and will pass through the post tops. The couplings used to join the top rail lengths will allow for expansion.

3.4 Installing Braces. Horizontal brace rails, with diagonal truss rods and turnbuckles, will be installed at all terminal posts.

3.5 Installing Fabric. The wire fabric will be firmly attached to the posts and braced in the manner shown on the plans. All wire will be stretched taut and will be installed to the required elevations. The fence will generally follow the contour of the ground, with the bottom of the fence fabric no less than 1 inch (25mm) or more than 4 inches (100mm) from the ground surface. Grading will be performed where necessary to provide a neat appearance.

At locations of small natural swales or drainage ditches and where it is not practical to have the fence conform to the general contour of the ground surface, longer posts may be used and multiple strands of barbed wire stretched thereon to span the opening below the fence. The vertical clearance between strands of barbed wire will be 6 inches (150mm) or less.

Openings below the fence may also be spanned with barbed wire fastened to stakes.

3.6 Electrical Grounds. Electrical grounds will be constructed where a power line passes over the fence and at 500-foot (150m) intervals. The ground will be installed directly below the point of crossing. The ground will be accomplished with a copper clad rod 8 feet (2.4m) long and a minimum of 5/8 inch (15mm) in diameter driven vertically until the top is 6 inches (150mm) below the ground surface. A No. 6 solid copper conductor will be clamped to the rod and to the fence in such a manner that each element of the fence is grounded.

3.7 Installing Gates. The gates will be hung on gate fittings as shown on the plans. The lower hinge (ball and socket type) will be placed on top of the concrete footing in which the gate post is set; the

concrete in the footing will extend up to the bottom of the lower hinge. The sockets for the cane or foot bolts will be set in concrete so that the plunger pin will fit perfectly in the socket when the gate is in a closed position. Gates will be erected to swing in the direction indicated and will be provided with gate stops as specified or as shown on the plans. All hardware will be thoroughly secured, properly adjusted, and left in perfect working order. Hinges and diagonal bracing in gates will be adjusted so that the gates will hang level.

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 post with a brace post will be set at the junction and braced the same as herein described for corner posts or as shown on the plans.

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. When warning signs are specified to be furnished and installed, they will be constructed to the specifications detailed on the plans, and fastened to the fence fabric by ties made of the same material used for fence ties. Signs will be installed with their top edge approximately 4 to 6 inches below the top of fence, but not more than 5-1/2 feet above ground on fences over 6 feet in height.

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

METHOD OF MEASUREMENT

4.1 Chain link fence will be measured for payment by the linear foot (meter). Measurement will be along the top of the fence from center to center of end posts, excluding the length occupied by gate openings.

Gates will be measured as complete units.

Barbed wire extension arms with barbed wire, when specified, will be measured in the same manner as fence. Barbed wire extensions on gates are a part of the specified gate.

Closure of openings under fence, when specified will be measured as units for each closure made and accepted, that exceeds the size specified for incidental closures.

Ground rods will be measured as units for each ground rod installed and accepted.

Warning signs, when specified, will be measured as units for each size of type sign installed and accepted.

BASIS OF PAYMENT

5.1 Chain Link Fence. Payment will be made at the contract unit price per linear foot for each height and type of chain link fence specified. 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.

5.2 Gates. Payment will be made at the contract unit price per each for each height, width, and type of single-leaf or double-leaf gate specified. This price will be full compensation for furnishing all materials, and all preparation, erection, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete the item.

5.3 Barbed Wire. Payment will be made at the contract unit price per linear foot for barbed wire extension arms with barbed wire. This price will be full compensation for furnishing all materials and all preparation, erection, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

5.4 Ground Rods. Payment will be made at the contract unit price per each for each ground rod specified and installed. This price will be full compensation for furnishing all materials and all preparation, erection, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

5.5 Miscellaneous. Payment will be made at the contract unit price per each for each item of closure of opening under fence or warning sign specified and installed. These prices 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 each item.

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

The first three digits of any item number for work included under this specification will be 162, i.e., 162XXXX.

TESTING AND MATERIAL REQUIREMENTS

ASTM A120	Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses.
ASTM 1121	Zinc-Coated (Galvanized) Steel Barbed Wire
ASTM A123	Zinc (Hot Galvanized) coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
ASTM A153	Zinc-Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A392	Zinc-Coated Steel Chain Link Fence Fabric
ASTM A491	Aluminum-Coated Steel Chain Link Fence Fabric
ASTM A570	Hot-Rolled Carbon Steel Sheet and Strip Structural Quality
ASTM A572	High Strength Low Alloy Columbium-Vanadium Steels of Structural Quality
ASTM A585	Aluminum-Coated Steel Barbed Wire
ASTM B211	Aluminum Alloy Bar, Rod, and Wire
ASTM B221	Aluminum Alloy Extruded Bars,

Rods, Wire Shapes and Tubes

*RR-F-191/1 – Fencing, Wire and Post, Metal
(Chain Link Fence Fabric)

*RR-F-191/3 – Fencing, Wire and Post, Metal
(Chain Link Fence Posts, Top Rails
and Braces)

*RR-F-191/4 – Fencing, Wire and Post, Metal
(Chain Link Fence Accessories)

**NOTE: Others as required by referenced
specifications**

***Federal Specifications**