



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: December 17, 2014
To: MAG Specifications and Details Committee
From: Robert Herz, MCDOT Representative
Subject: Proposed Revisions to Section 772, Table 771-1, and Detail 145 **Case 15-02**

PURPOSE: Adjust fence requirements to reference ASTM F1043 Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework.

REVISIONS:

1. Revise Note 1 on Detail 145 to read as follows:
 1. Posts and rails shall be 1.90 inch outside diameter high strength heavy industrial steel pipe conforming to ASTM F1043 Material Group IA-2 (2.72 lb/ft, minimum yield strength = 50 ksi) or Material Group IC galvanized after forming (2.28 lb/ft, minimum yield strength = 50 ksi).
2. Specification Section 771 GALVANIZING Modify Table 771-1 by adding ASTM F1043 groups IA and IC to the row for Steel Pipe – Rails and Post.

TABLE 771-1		
GALVANIZING SPECIFICATIONS		
Material	ASTM Spec.	Wt. of Coating Oz./Sq. Ft. (Min.)
Corrugated Metal Pipe	A929	1.80
Flat Steel or Iron Sheets	A653, A924	1.25
Iron or Steel Wire	A116	.80
Chain Link Fabric	A392	1.20
Barbed Wire	A121	.50
Steel Pipe - Rails and Posts	A53,	1.8
	F1043 IA	1.8
	F1043 IC Galvanized After Forming	0.9 oz w/chromate and organic clearcoat
Structural Shapes, Tie Rods, Ornamental Iron Railings, Handrails, Manhole and Catch Basin Steps, and Curb Armor	A123	2.00
Bolts, Nuts, Washers, Anchor Bolts, Packing Spools, Gray Iron and Malleable Iron Castings and Steel Castings	A153	1.25

3. Section 772 CHAIN LINK FENCE revise the material requirements identified in 772.2 POSTS, RAILS AND BRACES.

CHAIN LINK FENCE

772.1 GENERAL:

All material shall be new and, upon request, the Contractor shall furnish to the Contracting Agency, a certification of inspection stating that the materials have been manufactured, sampled, tested and inspected so as to meet the requirements for its type as specified below.

772.2 POSTS, RAILS AND BRACES:

Posts, rails and braces shall be constructed of pipe in conformance with types A, B or C below. Unless specifically designated by type in the plans or specifications, the Contractor may utilize any of the three types. The posts and rails in this section will cover fencing up to 12 feet in height with post spacing not to exceed 10 feet. The nominal outside dimensions and minimum weights shall be in accordance with Table 772-1. The manufacturer or his representative shall legibly mark each length of pipe by rolling, stamping or stenciling to identify the product by product name, ASTM standard, etc. and the country of manufacture.

Type A: ~~Pipe s~~ Shall be manufactured in conformance to ASTM F1043 IA-2 black steel pipe, welded or seamless, hot-dipped zinc coated, ~~manufactured in conformance to ASTM F1083~~, plain end, standard weight (schedule 40). The hot-dipped zinc coating (galvanized) shall be applied both inside and outside with not less than 1.8 ozs. per square foot \pm 0.1 ozs.

Type B: Shall be manufactured in conformance to ASTM F1043 IC Galvanized After Forming. Steel used in the manufacturing of the pipe shall be hot-rolled strip steel in compliance with ASTM A1011 having a minimum yield strength of 50,000 psi. The pipe will be manufactured by electric welded cold-formed process per ASTM A500. The exterior surface will be triple coated and the interior surface single coated ~~per ASTM F1043~~. The triple coated external surface shall be hot-dipped zinc coated (galvanized) having a weight of not less than 1.0 ozs. per square foot \pm 0.1 ozs., followed by a chromate conversion coating, having a weight not less than 1.05 micro ounces per square foot \pm 0.353 micro ounces (30 micrograms per square inch \pm 15 micrograms) and an acrylic coating having a thickness of 0.0005 inches \pm 0.0002 inches. The internal surface shall be coated with a zinc base paint having a 90% zinc powder loading and having a minimum thickness of 0.0005 inches.

Type C: Shall be manufactured in conformance to ASTM F1043 IC Galvanized Before Forming. Steel used in the manufacturing of the pipe shall be strip steel in compliance with ASTM A653 Grade D having a minimum yield strength of 50,000 psi. Both sides of the strip shall be hot-dipped zinc coated (galvanized) per ASTM A653 and A-924 having the weight of not less than 1.0 oz. per square inch \pm 0.1 oz. The zinc coating will form the first coat of a triple coated external surface and the final coat of the interior surface. The pipe will be manufactured by electric welded cold formed process per ASTM A789. After manufacturing, the final two external coatings shall be a chromate conversion having a weight of not less than 1.05 micro ounces per square inch \pm 0.353 micro ounces and an acrylic coating having a thickness of 0.0005 inches \pm 0.0002 inches.

772.3 CHAIN LINK FABRIC:

Chain link fabric shall conform to the requirements of ASTM A392 (Zinc-Coated) or ASTM A491 (Aluminum-Coated). The coating process must leave the fabric completely free of barbs, icicles, or other projections which might be hazardous. The wire used in the manufacture of the fabric shall be 11 gage for all fence 60 inches or less in height and shall be 9 gage for all fence over 60 inches in height unless otherwise specified.

All chain link fabric shall be woven into approximately 2 inch mesh. Fabric less than 60 inches wide shall have knuckled finish on the top edge, and twisted and barbed finish on the bottom edge. Fabric 60 inches or reater in width shall have twisted and barbed finish on both edges. Barbing shall be done by cutting the wire on the bias.

772.4 TENSION WIRES AND FABRIC TIES:

Tension wires shall be at least 7 gage galvanized coil spring steel wire per ASTM A824. Ties used to fasten the fabric to posts, rails, and gate frames shall be not smaller than 11 gage galvanized steel, 6 gage aluminum wire, or approved non-corrosive metal bands.

Tension bars used in fastening fabric to end and corner posts and gate frames shall be galvanized high carbon steel bars not smaller than 3/16 inch x 3/4 inch.

TABLE 772-1					
FENCE MEMBER SIZES & WEIGHTS					
USE	FENCE HEIGHT (Feet)	NPS DESIGNATOR	OUTSIDE DIAMETER (Inches)	WEIGHT (Lb/Lf Minimum)	
				TYPE A Schedule 40	TYPE B and C
FENCE POSTS					
End, corner, slope, pull and strain posts	Less than 6	2	2.375	3.65	3.12
	6 and over but less than 9	2 1/2	2.875	5.79	4.64
	9 and over but not over 12	3 1/2	4.000	9.11	6.56
Line posts	less than 6	1 1/2	1.900	2.72	2.28
	6 and over but less than 9	2	2.375	3.65	3.12
	9 and over but not over 12	2 1/2	2.875	5.79	4.64
GATE POSTS					
Single swing gates 6 feet or less in width or double swing gates 12 feet or less	less than 6	2	2.375	3.65	3.12
	6 and over but not over 12	3 1/2	4.000	9.11	6.56
Single swing gates over 6 feet but not over 13 feet in width or double swing gates over 12 feet but not over 26 feet in width	—	3 1/2	4.000	9.11	6.56
Single swing gates over 13 feet but not over 18 feet in width or double swing gates over 26 feet but not over 36 feet in width	—	6	6.625	18.97	—
Single swing gates over 18 feet in width or double swing gates over 36 feet in width	—	8	8.625	28.55	—
OTHER MEMBERS					
Top rail and braces	—	1 1/4	1.666	2.27	1.84
Frame for gates	—	1 1/2	1.900	2.72	2.28
Stiffners for gates	—	1 1/4	1.666	2.27	1.84

Notes to Table 772-1:

- All unit weights shall be subject to the standard mill tolerance of ± 5 percent.
- Posts shall be fitted with tops designed so as to fit securely over the posts and carry a top rail where specified. They shall have a total length of not less than the depth of the concrete footings, as specified, plus the length required above ground. Where no top rail is required, pipe posts shall be fitted with suitable caps.
- Top rail shall be furnished in random lengths of approximately 20 feet where required.

772.5 TRUSS OR TENSION RODS:

Truss or tension rods used in trussing gate frames and line posts adjacent to end, corner, slope or gate posts shall be adjustable 3/8 inch diameter galvanized steel rod. When used in trussing line posts, adjustment shall be provided by means of galvanized, turnbuckle or other suitable tightening devices.

772.6 FITTINGS:

Fittings shall conform to ASTM F626.

Fittings, hardware, nuts and bolts shall be galvanized.

Couplings to connect the individual lengths of top rail shall be of the outside sleeve type at least 7 inches long. The bore of the sleeves shall be sufficiently true to maintain adjacent lengths of rail in alignment.

Extension arms for barbed wire on pipe posts shall be of 13 gage steel or heavier, single piece construction and a type that can be attached to the tops of the posts. Extension arms shall carry 3 wires at approximately 5 1/2 inch centers in a plane approximately 45 degrees from the vertical, inclined as shown on the plans or as directed by the Engineer.

772.7 BARBED WIRE:

Barbed wire shall be 4 point pattern; composed of 2 strands of 12 1/2 gage galvanized steel wire with barbs spaced 5 inches apart and shall conform to ASTM A121.

- End of Section -