

MAXSTOP

Welded Wire Security Fence

HIGH SECURITY PERIMETERS
SECURITY FENCE SPECIFICATIONS
Section 020108HS

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SECTION 020108HS

HIGH SECURITY PERIMETERS Welded Wire Mesh Fencing (Polymer Coated)

PART 1 GENERAL

1.1 STIPULATIONS

- A. The Specifications Section, "General Conditions", "Special Requirements" and "General Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

1.2 SCOPE

- A. This specification covers fencing materials for a complete galvanized and PVC coated (black) welded wire fence system and gates. Gate information as furnished by Tymetal Corp includes accessories and installation information.

1.3 Reference ASTM Documents:

- A. B 117-07 Standard Practice for Operating Salt Spray (Fog) Apparatus
- B. A 121-07 Standard Specification for Metallic-Coated Carbon Steel Barbed Wire
- C. A 123/A123M-02 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- D. A 153/A153M-05 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- E. A 307-07a Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
- F. A 780-00 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- G. A 853-04 Standard Specification for Steel Wire, Carbon, for General Use
- H. C 94/C 94M-07 Standard Specification for Ready-Mixed Concrete
- I. F 567-07 Standard Practice for Installation of Chain-Link Fence
- J. F 626-96a(2003) Standard Specification for Fence Fittings
- K. F 900-05 Standard Specification for Industrial and Commercial Swing Gates
- L. F 934-96(2003) Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence
- M. F 1043-06 Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework
- N. F 1083-06 Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
- O. F 1916-98 Standard Specifications for Selecting Chain Link Barrier Systems with Coated Chain Link Fence Fabric and Round Posts for Detention Applications (Grounding reference only)

- P. F 2453/F2453M-05 Standard Specification for Welded Wire Mesh Fence Fabric (Metallic-Coated or Polymer Coated) for Meshes of 6 in.² [3871 mm²] or Less, in Panels or Rolls, with Uniform Meshes

PART 2 PRODUCTS

2.1 MATERIAL

- A. All accessories shall be hot-dipped galvanized in accordance with ASTM A 123 or as specified herein. Hardware coatings shall conform to ASTM A 153. Steel pipe and other framework shall be hot-dip galvanized in accordance with ASTM F 1043. Strength requirements for pipe shall also conform to ASTM F 1043 (SS40). The product of the yield strength and section modulus shall not be less than that for pipe conforming to ASTM F 1043.
- B. Products shall be new from recognized, reputable manufacturers. The manufacturers shall have a minimum of 2 years experience. Used, re-rolled or re-galvanized material is not acceptable.
1. Manufacturers
 - a. Framework: Allied Tube and Conduit, Harvey, IL 1-800-882-5543
 - b. Welded Mesh: **C.E. Shepherd, Houston, TX 1-800-324-9473**
 - c. Gates: Tymetal Corp. Greenwich, NY 1-800-328-4283
- C. Welded Wire Fabric shall be fabricated from low carbon steel wire and electronically control welded, forming a specified mesh size. Welded mesh shall meet or exceed the requirements of ASTM F 2453, having a nominal tensile strength of 73,000 PSI (503 MPa.) After welding the pre-galvanized line and stay wires together a finished coating of 4 mil (0.102 mm) minimum polymer coating (black) is applied to the outer surface.
1. Polymer coating shall be sprayed or powder coated and adhered to the galvanized steel core wire. Polymer coating shall be applied in a continuous process.
 2. All cut ends shall be coated with vinyl at the factory before shipping.

Note: Welded mesh is measured wire center to wire center whereas chain link mesh openings are measured inside to inside of the diagonal wires with 1/8 in. (3 mm) tolerance. Consequently, welded mesh wires located 2 in. on center (51 mm) compares to 1-3/4 in. (44 mm) chain link.

- D. Fabric Heights:
1. Single welded mesh fence 8 ft. (2.3 m) plus 12in. (305 mm) as it pertains to “V” or 45 degree extension arm: the welded mesh fabric 0.5in. x 2in. or 0.5 in. x 3 in. x 10 gauge x 8 ft. (2.3 m) in height shall extend from the top of the concrete or finished grade to 4 in. above the top rail.
- E. Framework: strength and coating shall be in accordance with ASTM F 1043.
1. Grade A Pipe: hot-dipped galvanized Schedule 40 pipe conforming to ASTM F 1043 Group 1A.
 2. Grade B Pipe: manufactured by cold rolling and radial frequency welding, the steel shall conform to ASTM F 1043 Group IC with a minimum yield strength of 50,000 PSI (344.0 MPa). Exterior and Interior coatings shall be in accordance with ASTM F 1043 (SS40).

3. Polymer coating shall be 4 mils (0.25 mm) minimum in accordance with ASTM F 1043, color conforming to ASTM F 934 (black)
 4. Performance: all tubular framework shall meet the following performance in accordance with test method ASTM B 117 (Salt Spray Test)
 - a. Exterior: 1000 hours with maximum 5 percent red rust.
 - b. Interior: 650 hours with maximum 5 percent red rust.
 5. Wind loads: Post shall withstand 70 MPH minimum wind load.
 6. Post Sizes: determined in accordance with previously approved practices. Line, terminal and gate post shall not be less than 95% of the nominal weight conforming to ASTM F 1043 Group 1A, 1C.
 7. Rail Size: 1.660 in. (42mm) diameter rails. Select brackets and tie wires for securing welded mesh to tubular shapes.
- F. Fittings and Accessories
1. Post Tops: Pressed steel or malleable iron, designed as a weather tight enclosure for tubular post.
 2. Tension Bands: Tension bands shall be heavy - pressed steel, 3/4 in. (19 mm) x 1/10 in. (2.54 mm) nominal. Tension bands are used to secure fabric to end, corner and gate post with intervals of spacing not to exceed 15 in. (381 mm). Color to match fabric.
 3. Preformed Power Twisted Ties:
 - a. Fabric attachment to rails: 9 gauge (3.8 mm) ties for fabric wire sizes 10.5 gauge (3.3 mm) and larger.
 - b. Fabric attachment to line post: 9 gauge (3.8 mm) ties for fabric sizes 11 gauge and larger.
 - c. Ties shall be aluminized with a minimum coating of 0.40 oz. aluminum/ft² (0.122 g/m²) and polymer coated.
 - d. Tie Wire Manufacturer: L.C. Enterprises Tel: 866-786-1009
 4. Tie Spacing:
 - a. Top rails are at intervals not exceeding 24 in. (610 mm).
 - b. Bottom rail tie spacing intervals not to exceed 12 in. (305 mm).
 5. Brackets: Spacing for line and terminal posts are at intervals not exceeding 18 in. (457 mm). See drawing for tie wire and bracket location.

PART 3 EXECUTION

3.1 Installation

- A. Installation of the Framework Components: installation shall be in accordance with ASTM F 567 when applicable and as specified herein. Larger corner posts not required for welded mesh installations.

- B. Installation of Welded Wire Fabric components: follow the manufacturer’s recommendations.
- C. Site Preparation: Prior to the installation, all necessary grading and cleaning on both sides of fence shall be performed by the General Contractor or others responsible for site grading.
 - 1. Grading shall be done in such a manner as to provide a straight flat and level surface. Sloped angles shall be graded at the same angle to the next change of direction or grade change. Soil or stone fill shall be thoroughly compacted.
 - 2. All excavation shall be coordinated with respect to electrical and mechanical component installations. All existing utilities shall be located prior to starting excavation.
 - 3. Erect the fencing in straight lines between angle points. Erect framework in accordance with ASTM F 567 and as approved by shop drawings.
- D. Minimum Post Hole Diameters in concrete for 2.875 in. (73 mm) is 0.5 in. (127 mm) larger than the post. Alternatively, install sleeves during the pouring operation. The space around the post shall be filled with grout.

Post Hole Depth in Soil Table 1							
Exposed Height of Fabric		Line Post		Corner/End Pull Post		Setting Depth	
6 ft.	1.8 m	2.375 in.	60 mm	2.875 in.	73 mm	30 in.	762 mm
7 ft.	2.1 m	2.375 in.	60 mm	2.875 in.	73 mm	33 in.	838 mm
8 ft.	2.4 m	2.375 in.	60 mm	2.875 in.	73 mm	36 in.	914 mm
9 ft.	2.7 m	2.875 in.	73 mm	4.000 in.	102 mm	39 in.	990 mm
10 ft.	3.0 m	2.875 in.	73 mm	4.000 in.	102 mm	42 in.	1066 mm
11 ft.	3.4 m	2.875 in.	73 mm	4.000 in.	102 mm	45 in.	1143 mm
12 ft.	3.7 m	2.875 in.	73 mm	4.000 in.	102 mm	48 in.	1219 mm
13 ft.	4.0 m	2.875 in.	73 mm	4.000 in.	102 mm	51 in.	1295 mm
14 ft.	4.3 m	3.500 in.	89 mm	4.000 in.	102 mm	54 in.	1372 mm
15 ft.	4.6 m	3.500 in.	89 mm	4.000 in.	102 mm	57 in.	1447 mm
16 ft.	4.9 m	4.000 in.	102 mm	6.525 in.	168 mm	60 in.	1524 mm

Note: The depth shall be a minimum of 24 in. (610 mm) plus 3 in. (76 mm) for each 1.0 ft. (0.305 m) increase in the fence height over 4 ft. (1.2 m) as per ASTM A 567.

- E. Post Holes in Solid Rock or Concrete:
 - 1. Drill holes into solid rock or concrete 1/2 in. (13 mm) wider than pipe diameter; 18 in. (457 mm) deep for end, corner and gate posts; and 12 in. (305 mm) deep for line post.
 - 2. Half-fill the void with non-shrinkable grout and force the post to the bottom of the hole, leaving no voids. Crown the grout to shed water. The use of sleeves in new concrete is recommended.
- F. Concrete Mix: Shall be in accordance with ASTM C 94 with maximum 3/4 in. (19 mm) aggregate, and having a minimum compression strength of 3000 PSI (20.69 MPa.) at 28 days. Concrete shall be thoroughly worked into the post holes leaving no voids.
- G. Cure: Concrete to cure a minimum of (7 days) before installing fence fabric or fittings. The top surface of the post footing shall have a crown water shed finish.

- H. Post Spacing: Space post equal distance in the fence line to a maximum of 10 ft. (3m). No terminal posts larger than line posts required, except for gate posts.

Note: Welded mesh requires no stretching.

- I. Rails: Install rails as called for on the drawings and in these specifications. All rails shall be installed on the side of the fence least accessible to climbing from the outside. No corner bracing is required for welded wire fabric installations

1. Top rails: With the use of 7 in. (178 mm) sleeves, top rail shall run continuously through the top loop caps. Intermediate and bottom rails shall be connected to the line and terminal posts using boulevards or bands and rail ends. Attachment bolts for bands shall be 5/16 in. (7.9 mm) x 1-1/2 in. (38 mm) carriage bolts with nuts.
2. Boulevard bolts shall be 3/8 in. (10 mm) minimum in diameter. Middle and bottom rails locations shall correspond with this specification and project drawings.
3. Tie wire twisted ends shall turn downward to prevent accidental contact causing injury.

- J. Welded Wire Fabric General:

1. Welded wire panels are fabricated to correspond with the widths and heights specified.
2. Welded mesh panels are attached with a combination of brackets and tie wires in accordance with the drawing. Preformed 1 in. (25.4 mm) x 10 gauge (3.4 mm) thick two piece brackets, zinc/aluminum and polymer coated are secured to the line post and rails with 5/16 in. (7.9 mm) carriage bolts. Terminal post connections are comprised of tension bands.
3. Band spacing shall not exceed 18 in. (457 mm) for terminal post. See corner connection detail for securing tension bands. (Attach tension bands using the 5/16 in. bolts and nuts or other suitable means).

- K. Grounding to the Earth:

1. Grounding and bonding of the perimeter systems shall be in accordance with the N.E.C. (National Electric Code), N.E.S.C. (National Electric Safety Code) ASTM F 1916 and as specified herein. Contractor will employ a certified electrician to perform all grounding procedures.
2. Since the fence system is insulated one component from the other, grounding is not required on polymer coated fence systems. Check with the authority having jurisdiction.
3. Fences crossing power lines of 600 volts or more shall be grounded at or near the point of crossing and at distances not exceeding 150 feet (46 m) on each side of crossing. Where electronic detection is an integral part of the fence, grounding electrodes shall be installed at 200 ft. (61 m) intervals along the fence line. (For additional information, consult with the electronic system manufacturer.)
4. The grounding electrodes shall be a minimum 3/4 in.(19 mm) diameter x 10 ft. (3 m) long copper clad rod, driven into the earth until the top is 12 in (305 mm) below grade. Attach a No. 2 AWG bare stranded copper conductor by exothermically welding to the ground rods and extend underground in the immediate vicinity of the fence post.

5. Secure the grounding conductor to the post with 5/16 in. (7.9 mm) self-tapping galvanized or stainless steel bolts and approved copper compression terminal ends or clamps.
6. After grounding connections have been completed, perform a ground resistance test in the presence of the owner's representative. The ground resistance shall not exceed 25 OHMS under normal dry conditions. Where resistance requirements cannot be attained, install additional rods no closer than 6 ft. (1.8 m) on center. Install no more than two additional rods at each location.
7. Consult with the Airport Electrical Engineer, regarding where the fence grounding system should connect to existing grounding grid.

3.2 CLEANING

- A. Upon completion of the installation, clean up all waste material resulting from the fence construction.

END OF SECTION