FENCE CONTRACTOR
**License # 1033886**
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**DIR# PW-LR-1000580252**

**JULY 23, 2025**
**TO: BAKERSFIELD CITY SCHOOL DISTRICT**
**PROJECT: FLETCHER ELEMENTARY SCHOOL – SITEWORK FOR (1) PERMANENT MOCULAR CLASSROOM BUILDING / 23247.00-12-PMC / BP-04 FENCING**

## ***SUBMITTALS***

**6' TALL CHAIN LINK FENCE 9 GA 2" MESH, 2 3/8" OD SCH 40 LINE POST, TERMINAL AND SINGLE MAN GATE POST TO BE 2 7/8 OD SCH 40, 1 5/8" TOP RAIL AND BRACES, 7 GA COIL SPRING BOTTOM TENSION WIRE.1- 4' X 6' TALL CHAIN LINK CINGLE MAN GATE WITH LOCINOX LATCH.**

**PROJECT MANAGER/ ESTIMATOR**
**RAMIRO SANTIVANES**
**NORTHERN UNITED FENCE INC.**
**CELL: 661-873-3422**

| | | | |
|---|---|---|---|
| [X] | REVIEWED | [ ] | NOT ACCEPTABLE |
| [ ] | REVISE AND RESUBMIT | [ ] | FOR RECORD ONLY |
| [ ] | REVIEWED AND CORRECTED | | |

The review of Shop Drawings and/or Submittals is only for conformance with the design concept of the Project and compliance with the information given in the contract documents. Contractor is responsible for dimension confirmation and correlation at the job site, for information that pertains solely to the fabrication processes or to techniques of construction, and for coordination of the work of all trades involved in the project. The review of these Shop Drawings and/or Submittals does not relieve the Contractor from compliance with the Contract Documents.

**Ordiz-Melby Architects, Inc.**

BY _____ DATE 07/31/2025

## DESCRIPTION OF TERMS

A short list of descriptive terms: (See ASTM F552, "Standard Terminology Relating to Chain Link Fencing" for a complete list.)

a. Chain link fabric – A fencing material consisting of wire helically wound and interwoven in such a manner as to provide a continuous mesh without knots or ties except in the form of knuckling or twisting at the top and bottom of the mesh to form the fabric selvage.
b. Selvage-The top and bottom edge finish on woven chain link formed by joining adjacent pairs of wire pickets. The selvage may be knuckled or twisted.
c. Knuckled selvage* refers to bending the adjacent pairs of wire back into a tight loop.
d. Twisted selvage* refers to twisting the adjacent pairs of wire together in a close helix of 1 ½ machine turns, which is equivalent to three full twists.
e. Mesh size – The minimum clear distance between the wires forming the parallel sides of the mesh.
f. Terminal post – A post to which the chain link fabric is terminated using specific fittings; end post, corner post, gate post and pull post (a terminal post used to accommodate a grade or placed at intervals on long stretches of fence).
g. Line post- Intermediate posts set no greater than 10 feet on center between the terminal posts.
h. See drawing Typical Fence Section for details of various fence fittings; tension bar, truss rod, tension band, brace band, rail end and barb arm.

**KNUCKLE SELVAGE***

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MERCHANTS METALS SPEC TECH

# Schedule 40 Pipe, Galvanized

## ASTM 1083, ASTM F1043 Group IA, Federal specification RR-F-191/3E
## RR-F-191/3E, AASHTO M-181 Grade 1

**ASTM F1083 Regular Grade 30,000 psi yield Schedule 40 Pipe - Dimension and Strength Characteristics**

| Fence Industry | Decimal O.D. Equivalent | | Pipe Wall Thickness | | Weight | | Section Modulus | | X | Min. Yield Strength | | = | Max Bending Moment | Calculated Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O.D. | in. | mm | in. | mm | lb./ft. | kg/m | $in.^3$ | $mm^3$ | | psi | MPa | | lb./in. | 10 ft. Free Supported |
| 1 ⅜ in. | 1.315 | 33.40 | 0.133 | 3.38 | 1.68 | 2.50 | 0.1328 | 3.37 | X | 30,000 | 205 | = | 3,985 | 133 |
| 1 ⅝ in. | 1.660 | 42.16 | 0.140 | 3.56 | 2.27 | 3.38 | 0.2346 | 5.96 | X | 30,000 | 205 | = | 7,038 | 235 |
| 1 ⅞ in. | 1.900 | 48.26 | 0.145 | 3.68 | 2.72 | 4.05 | 0.3262 | 8.29 | X | 30,000 | 205 | = | 9,786 | 326 |
| 2 ⅜ in. | 2.375 | 60.33 | 0.154 | 3.91 | 3.65 | 5.43 | 0.5606 | 14.24 | X | 30,000 | 205 | = | 16,819 | 561 |
| 2 ⅞ in. | 2.875 | 70.03 | 0.203 | 5.16 | 5.80 | 8.62 | 1.0640 | 27.03 | X | 30,000 | 205 | = | 31,921 | 1,064 |
| 3 ½ in. | 3.500 | 88.90 | 0.216 | 5.49 | 7.58 | 11.28 | 1.7241 | 43.79 | X | 30,000 | 205 | = | 51,723 | 1,724 |
| 4 in. | 4.000 | 101.60 | 0.226 | 5.74 | 9.12 | 13.56 | 2.3939 | 60.80 | X | 30,000 | 205 | = | 71,816 | 2,394 |
| 4 ½ in | 4.500 | 114.30 | 0.237 | 6.02 | 10.80 | 16.07 | 3.2145 | 81.65 | X | 30,000 | 205 | = | 96,435 | 3,214 |
| *5 ⅝ in | 5.563 | 141.30 | 0.258 | 6.55 | 14.63 | 21.77 | 5.4511 | 138.46 | X | 35,000 | 240 | = | 190,789 | 6,359 |
| *6 ⅝ in | 6.625 | 168.28 | 0.280 | 7.11 | 18.99 | 28.23 | 8.4958 | 215.79 | X | 35,000 | 240 | = | 297,353 | 9,912 |
| *8 ⅝ in | 8.625 | 219.08 | 0.322 | 8.18 | 28.58 | 42.49 | 16.8091 | 426.95 | X | 35,000 | 240 | = | 588,319 | 19,610 |

* Manufactured to ASTM A53, exceeds F1083 requirments.

Top Rail / brace
Gate Frame
line post
terminal / gate post

**ASTM F1083 Intermediate Grade 50,000 psi yield Schedule 40 Pipe - Dimension and Strength Characteristics**

| Fence Industry | Decimal O.D. Equivalent | | Pipe Wall Thickness | | Weight | | Section Modulus | | X | Min. Yield Strength | | = | Max Bending Moment | Calculated Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O.D. | in. | mm | in. | mm | lb./ft. | kg/m | $in.^3$ | $mm^3$ | | psi | MPa | | lb./in. | 10 ft. Free Supported |
| 1 ⅝ in. | 1.660 | 42.16 | 0.140 | 3.56 | 2.27 | 3.38 | 0.2346 | 5.96 | X | 50,000 | 345 | = | 11,730 | 392 |
| 1 ⅞ in. | 1.900 | 48.26 | 0.145 | 3.68 | 2.72 | 4.05 | 0.3262 | 8.29 | X | 50,000 | 345 | = | 16,310 | 543 |
| 2 ⅜ in. | 2.375 | 60.33 | 0.154 | 3.91 | 3.65 | 5.43 | 0.5606 | 14.24 | X | 50,000 | 345 | = | 28,030 | 935 |
| 2 ⅞ in. | 2.875 | 73.03 | 0.203 | 5.16 | 5.80 | 8.62 | 1.0640 | 27.03 | X | 50,000 | 345 | = | 53,200 | 1,773 |
| 3 ½ in. | 3.500 | 88.90 | 0.216 | 5.49 | 7.58 | 11.28 | 1.7241 | 43.79 | X | 50,000 | 345 | = | 86,205 | 2,873 |
| 4 in. | 4.000 | 101.60 | 0.226 | 5.74 | 9.12 | 13.56 | 2.3939 | 60.80 | X | 50,000 | 345 | = | 119,695 | 3,990 |
| 4 ½ in | 4.500 | 114.30 | 0.237 | 6.02 | 10.80 | 16.07 | 3.2145 | 81.65 | X | 50,000 | 345 | = | 160,725 | 5,357 |
| 5 ⅝ in | 5.563 | 141.30 | 0.258 | 6.55 | 14.63 | 21.77 | 5.4511 | 138.46 | X | 50,000 | 345 | = | 272,555 | 9,085 |
| 6 ⅝ in | 6.625 | 168.28 | 0.280 | 7.11 | 18.99 | 28.23 | 8.4958 | 215.79 | X | 50,000 | 345 | = | 424,790 | 14,160 |
| 8 ⅝ in | 8.625 | 219.08 | 0.322 | 8.18 | 28.58 | 42.49 | 16.8091 | 426.95 | X | 50,000 | 345 | = | 840,455 | 28,015 |

Technical Sales Department:
Email: Tech-Info@merchantsmetals.com
Website: www.merchantsmetals.com

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**TABLE 3 STANDARD 1" & LARGI I: MESH SIZES AND GAUGES FOR CHAIN LINK FABRIC**
**ASTM A392 galvanized, ASTM A49: aluminum coated, ASTM F1345 zinc-5%aluminum-mischmetal alloy, ASTM F668 poly ·ier coated**

| Size of mesh | Gauge* | Nominal Diameter | Recommended Usage |
|---|---|---|---|
| 2 1/8" [54 mm] | 11 ½ | 0.113" [2.87 mm] | Residential |
| 2" [50 mm] | 11 | 0.120" [3.05 mm] | Residential/light commercial |
| 2" [50 mm] | 9 | 0.148" [3.76 mm] | Residential /commercial/ind. |
| 2" [50 mm] | 6 | 0.192" [4.88 mm] | Commercial/ind./security |
| 1 ¾" [44 mm] | 11 | 0.120" [3.05 mm] | Tennis court |
| 1 ¾" [44 mm] | 9 | 0.148" [3.76 mm] | Heavy commercial/industrial |
| 1 ¾" [44 mm] | 6 | 0.192" [4.88 mm] | Security |
| 1 ¼" [32 mm] | 11 | 0.120" [3.05 mm] | Residential/swimming pool |
| 1 ¼" [32 mm] | 9 | 0.148" [3.76 mm] | Heavy industrial /Security |
| 1" [25 mm] | 11 | 0.120" [3.05 mm] | Industrial |
| 1" [25 mm] | 9 | 0.148" [3.76 mm] | Heavy industrial/ Security |

*polymer coated core wire gauge is spi cified gauge reference not :he coated finished diameter

**TABLE 1 BREAKING STRENGTH OF STEEL WIRE**

| | | |
|---|---|---|
| 6 gauge -0.192" | [4.88 mm] | 2170 lbf [9650 N] |
| 9 gauge- 0.148" | [3.76 mm] | 1290 lbf [5740 N] |
| 11 gauge- 0.120" | [3.05 mm] | 850 lbf [3780 N] |
| 11 ½ gauge- 0.113" | [2.87 mm] | 750 lbf [3340 N] |
| 12 gauge- 0.105" | [2.67 mm] | 650 lbf [2890 N] |
| 14 gauge- 0.080" | [2.03 mm] | 380 lbf [1690 N] |

**TABLE 2 THICKNESS OF ASTM F668 FABRIC POLYMER COATING**

| Minimum/Maximum | Class 1 & Class 2a | Class 2b |
|---|---|---|
| Minimum @ any point | 0.015 in. [0.38 mm] | 0.006 in. [0.15 mm] |
| Maximum @ any point | 0.025 in. [0.64 mm] | 0.010 in. [0.25 mm] |

MERCHANTS METALS SPEC TECH

# Fence Fittings

## ASTM F626, Federal specification RR-F-191/4F, AASHTO M-181

### 1. PRODUCT NAME
Fence Fittings, Chain Link

### 2. MANUFACTURER
**Merchants Metals**
**Corporate Headquarters:**
211 Perimeter Center Parkway
Suite 250
**Atlanta, GA 30346**
Phone: (866) 888-5611
Merchants Metals Service Centers are located throughout the United States.

**Harrison, AR 72601**
300 N. Industrial Park Road
Phone: (877) 258-9576
Fax: (870) 741-6163

### 3. PRODUCT DESCRIPTION
#### *Basic Use:*
Fence fittings include those items that are routinely used in conjunction with metallic coated chain link fabric and framework to complete a chain link fence installation.

#### *Composition and Materials:*
Fence fittings for chain link fence may be manufactured from steel or aluminum alloy. Steel items are galvanized after fabrication.

#### *Standards:*
ASTM A641/A641M Specification for Zinc–Coated (Galvanized) Carbon Steel Wire
ASTM A809 Specification for Aluminum-Coated (Aluminized) Carbon Steel Wire
ASTM A817 Specification for Metallic-Coated Steel Wire for Chain-Link Fence Fabric and Marcelled Tension Wire
ASTM B26/B26M Specification for Aluminum-Alloy Sand Castings
ASTM B85/B85M Specification for Aluminum-Alloy Die Castings
ASTM B108/B108M Specification for Aluminum-Alloy Permanent Mold Castings
ASTM B117 Practice for Operating Salt Spray (Fog) Apparatus
ASTM B209/B209M Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B211/B211B Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire
ASTM B221/B221M Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM F552 Terminology Relating to Chain Link Fencing
ASTM F626 Standard Specification for Fence Fittings
ASTM F668 Specification for Polyvinyl Chloride (PVC), Polyolefin and Other Polymer-Coated Steel Chain Link Fence Fabric
ASTM F934 Specification for Colors for Polymer-Coated Chain Link Fence Materials
Federal specification RR-F-191/4F Chain Link Fence Accessories
American Association of State Highway Transportation Officials (AASHTO) M-181 Chain Link Fence

### 4. TECHNICAL DATA
#### *General:*
The manufacturer, if requested, will supply samples and certification that all materials comply with the appropriate specifications.

#### *Post and Line Caps:*
Post and line caps are fabricated from pressed steel or cast iron and hot-dip galvanized with a minimum of 1.2oz/ft² (366 g/m²) of zinc coating of surface area, or from aluminum alloy 380.0 conforming to die cast Specification ASTM B85/B85M, or sand cast or permanent mold alloy 356.0 or 713.0 conforming to Specification ASTM B26/B26M or ASTM B108.

#### *Rail and Brace Ends:*
Rail and brace ends are fabricated from pressed steel or cast iron and galvanized with a minimum of 1.2 oz/ft² (366 g/m²) of zinc, or aluminum alloy 6063-T6 (ASTM B221 or B429). The thickness is 0.051 in. (1.3 mm) of steel or 0.062 in. (1.8 mm), of aluminum alloy, minimum length is 6 in. (152 mm).

#### *Top Rail Sleeves:*
Top rail sleeves shall be fabricated from pressed steel or round steel tubing and hot-dip galvanized with a minimum of 1.2oz /ft² (366 g/m²) of zinc coating surface area, or from aluminum alloy 6063-T6 (see Specification B221/B221M or Specification B429/B429M). Rail sleeve material shall be a minimum of 0.051 in. (1.3 mm) in thickness if steel, or a minimum of 0.062 in. (1.8mm) in thickness if aluminum alloy, and a minimum of 6 in. (152.4 mm) in length.

#### *Tie Wires and Hog Rings:*
Tie Wire used to tie fabric to frame work and Hog rings for attaching fabric to tension. Fabricated from steel wire galvanized minimum zinc coating 1.2oz/ft² (366 g/m²) 9 gauge (0.148) (3.76 mm) steel wire - lighter gauge steel wire may be used on lighter gauge mesh, see ASTM F626.

#### *Tension and Brace Bands:*
Tension and brace bands are fabricated from pressed steel or cast iron and galvanized with a minimum of 1.2 oz/ft² (366 g/m²) of zinc, or aluminum alloy 6063-T5, 6063-T6, or 8176-H19 (ASTM B211/B211M or B221/B211M). Tension bands have a minimum material thickness of 14 ga. (0.074 in. (1.88 mm) and a minimum width of ¾ in. (19 mm). Brace bands have a minimum material thickness of 12 ga. (0.105 in. 2.66 mm) and a minimum width of ¾ in. (19 mm).

#### *Tension bars:*
Steel tension bars are fabricated from merchant quality steel and galvanized, minimum zinc coating weight 1.2oz/ft² (366 g/m²). Steel tension bars used to connect 1-3/4 in. (44 mm) and 2 in. (50 mm) mesh fabric to end, gate and corner posts are a minimum 3/16 in. (4.8 mm) by 5/8 in. (16 mm) for fabric heights to 5 ft. (1,520 mm) and 3/16 in. (16 mm) by 3/4 in. (19 mm) for fabric heights over 5 ft. (1,520 mm). Tension bars used to connect 1 in. mesh fabric to end; gate and corner posts are a minimum 1/4 in. (6 mm) by 3/8 in. (10 mm). The minimum length of a tension bar is 2 in. (50 mm) less than the full height of the chain link fabric.

#### *Truss Rod and Tightener:*
Steel truss rods shall be fabricated from 3/8 in. (9.5mm) merchant quality rod and it and all related devices shall be hot-dip galvanized after threading with a minimum of 1.2oz/ft² (366 g/m²) of zinc coating and shall withstand 2000lb (900 kg) of tension.

#### *Barbed Wire Arms:*
Barbed wire arms shall be fabricated from pressed steel or cast iron, and hot-dip galvanized with a minimum 1.2 oz/ft² (366 g/m²) of zinc coating. Barbed wire arms are available as various types.

#### *Tension Wire:*
Tension wire per ASTM A817 Specification for Metallic-Coated Steel Wire for Chain-Link Fence Fabric and Marcelled Tension Wire, shall be 7 gauge (0.177 + 0.005 in. (4.50 + 0.13 mm) is either zinc or aluminum coated:

Type I - Aluminum-coated (aluminized), minimum average coating weight 0.40oz/ft² (122 g/m²).

Type II - Zinc-coated (galvanized), Class 4, minimum average coating weight 1.2oz/ft² (366 g/m²).

Minimum breaking strength is 1,950 lbf [8,670 N].

### COLOR COATING OF FITTINGS:
Fittings may be color coated with a polymer to match the fabric, when so specified. Standard colors are as contained in ASTM F934. Painted fittings are not acceptable. The exterior surface of the fittings shall be polymer coated with a minimum 0.006-in (0.152-mm), maximum 0.015-in (0.381-mm) thickness when so specified. Ferrous fittings shall be hot-dip galvanized prior to application of color coating.

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*the first name in fence solutions*

*Revised: April 2021*

MERCHANTS METALS SPEC TECH

# Fence Fittings

## ASTM F626, Federal specification RR-F-191/4F, AASHTO M-181

### 5. AVAILABILITY AND COST

***Availability:***

Chain link fittings are available for shipment throughout the United States and worldwide.

***Cost:***

Costs may vary with specific project requirements. Costs may be obtained through all Merchants Metals Service Centers.

### 6. MAINTENANCE

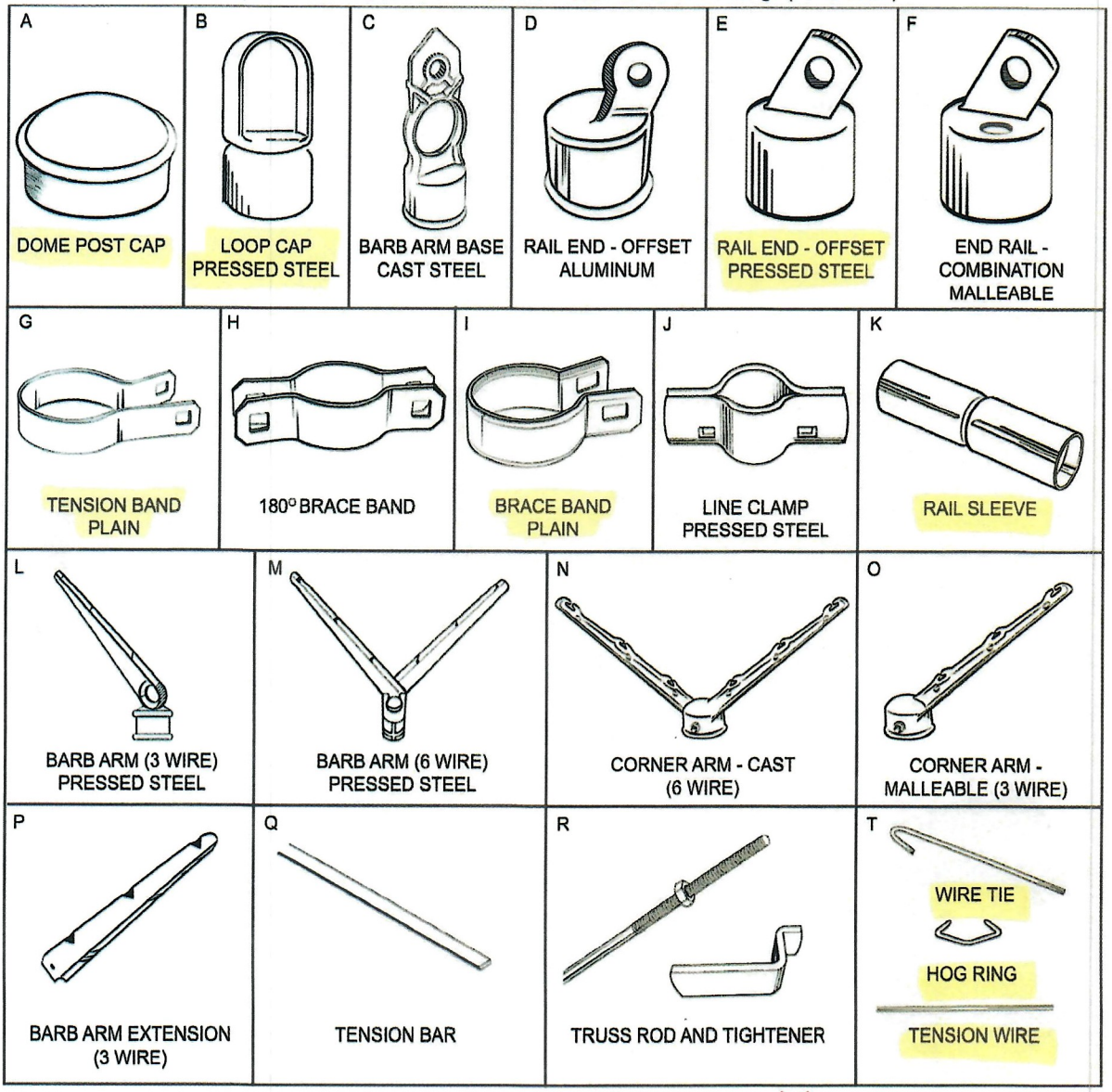
Periodic inspection is recommended but no routine maintenance is required.

### 7. TECHNICAL SERVICES

Specifications, drawings, and other technical services are available through the Merchants Metals Technical Sales Department or your local Merchants Metals Service Center.

Technical Sales:
Email: Tech-Info@merchantsmetals.com
Website: www.merchantsmetals.com

Representative Illustrations of Common Chain Link Fence Fittings (not to scale)

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*Revised: April 2021*