SECTION 32 31 00

FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of Work
B. Chain Link Fencing Installation
C. Removal of Existing Fences

1.02 DESCRIPTION OF WORK

A. This section shall include the furnishing of materials, erection, and installation of new chain link fencing and gates, the relocation of existing fences and gates, and all incidental work necessary for completed fencing work as specified in the contract documents. Fence fabric shall be galvanized with fused on black vinyl coating per requirements.

1.03 SUBMITTALS

A. Submit catalog cuts/certifications of fence products showing materials meet specifications.
B. Submit operation sequence to predrill and recover post holes.

1.04 SPECIAL REQUIREMENTS

A. Provide chain link fencing and gates as completed units constructed by a single source including necessary erection accessories, fittings, and fastenings.
B. Similar parts with different shapes or protective coatings shall not be intermingled within the Project.
C. Comply with the Voluntary Standard for Chain Link Fence Installation as per Chain Link Fence Manufacturer's Institute (CLFMI).

PART 2 PRODUCTS

2.01 MATERIALS

A. The Contractor shall provide all new fabric and framework with fittings, accessories, fasteners, wire, and gates to match, of the size and finish specified.
B. Fabric

Contractor shall provide PVC-coated over 9 ga. galvanized steel wire in accordance with ASTM F 668, Type 2B, 7 mil, thermally fused polyvinyl chloride in the color black as specified. Knuckle –Knuckle selvage. - Alternate Bid
Product shall be 2 oz./sf. galvanized 9 gage wire fabric of the height specified, knuckle-barb selvage.

C. Posts, Rails, And Braces: Either hot-rolled or cold-rolled posts, rails, and braces shall be used and be the lengths shown on the plans and/or details. The steel strip used in the manufacture of the pipe shall conform to ASTM A 1011.

Hot-Rolled Manufactured Posts, Rails, and Braces (Type I Pipe):

1. No used, rerolled or open seam material will be permitted in posts or rails.
2. Posts, rails, and braces shall be galvanized standard weight steel pipe meeting requirements of ASTM A 53 of the lengths shown on the plans and Standard Detail Plates.
3. Unless otherwise specified, the following nominal sizes for the respective uses are to be provided:

	HOT ROLLED (TYPE I PIPE) FENCE HEIGHT					
	48" & Under		Greater than 48" to 96"		Greater than 96"	
USE IN FENCE	Outside Diameter (inches)	Weight (lb/ft)	Outside Diameter (inches)	Weight (lb/ft)	Outside Diameter (inches)	Weight (lb/ft)
Line Post	2	2.74	2 1/2	3.65	3	5.79
*Terminal Post	2 1/2	3.65	3	5.79	4	9.11
Top/Intermediate/ Bottom Rail &	1 5/8	2.28	1 5/8	2.28	1 5/8	2.28

Bracings						
** Gate Post						
*Includes corner, angle, brace, and pull posts.						
**As shown on Standard Detail Plates.						

D. Cold-Rolled Manufactured Posts, Rails, and Braces (Type II - Pipe):
   1. The pipe shall be manufactured by cold rolling electric resistance welding and shall be given corrosion protection by in-line application of hot-dip galvanized zinc, followed by a chromate conversion coating and electrostatically sprayed thermoplastic acrylic coating on the outside surface.
      a. Hot-dipped zinc coating per ASTM B 6 high grade and special high grade. The weight of the hot-dipped zinc coating shall be 1.0 ounce/foot^2 $\pm$ 0.1. The weight of zinc coating shall be determined in accordance with ASTM A 90.
      b. Chromate conversion coating: The chromate coating weight shall be 30 micro-grams/square inch $\pm$ 10 micro-grams/inch^2. The coating weight shall be determined by a quantitative method.
      c. The thermoplastic electrostatically applied acrylic coating shall be 0.5 mils $\pm$ 0.1 mils thick.
   2. The inside surface shall be given corrosion protection by in-line application of a full zinc base organic coating after fabrication.
   3. Unless otherwise specified, the following nominal sizes for the respective uses are to be provided:

	COLD ROLLED (TYPE II PIPE) FENCE HEIGHT					
	48" & Under		Greater than 48" to 96"		Greater than 96"	
USE IN FENCE	Outside Diameter (inches)	Weight (lb/ft)	Outside Diameter (inches)	Weight (lb/ft)	Outside Diameter (inches)	Weight (lb/ft)
Line Post	2	2.28	2 1/2	3.11	3	4.64
*Terminal Post	2 1/2	3.11	3	4.64	4	6.56
Top/Intermediate/ Bottom* Rail & Bracings	1 5/8	1.84	1 5/8	1.84	1 5/8	1.84
*Includes corner, angle, brace, and pull posts.						

*Use Bottom rail on all fences.

E. PVC Coating: Contractor shall provide for all framework, posts, and gates specified for vinyl coating, a PVC-coated finish in accordance with ASTM F 1234, apply supplemental color coating of 10 to 14 mils of thermally fused polyvinyl chloride in the color black as specified to match fabric. - Alternate Bid.

2.02 FITTINGS

A. All special fittings except aluminum fittings, shall have a galvanized coating applied by the hot-dip process of not less than 0.8 ounce per square foot.
B. Braces shall be attached to posts by fittings that will hold both post and brace rigidly.
C. Diagonal tension rods shall be 3/8 inch round steel rods with an appropriate commercial means for tightening.
D. A locknut or other device shall be provided to hold the tightening device in place.
E. A suitable sleeve or coupling device, recommended by the manufacturer, shall be provided to connect sections of top rail and shall provide for expansion and contraction.
F. Posts shall be provided with a suitable cap which is secured. Stretcher bars not less than 3/8 inch diameter, or equivalent cross-section area, with suitable clamps shall be used for attaching fabric to corner, end, or gate posts.
G.

2.03 BOTTOM TENSION WIRE (Not Applicable)

A. No. 7 gauge hot-dipped galvanized wire or aluminum-coated steel wire shall be used on fences 48" and lower. Coatings shall meet requirements of 64-2.1, Fabric Material.
   1. Minimum weight of galvanized coating shall be 0.40 ounce per square foot of wire surface.
   2. Minimum weight of aluminum coating shall be 0.25 ounce per square foot.

2.04 FASTENERS

A. Fasteners to attach the fabric to braces and rails shall be aluminum 9 gauge tie wires. Each end of the tie wire will be secured to the fabric with a double turn.

2.05 GATES

A. The type and width of gates shall be as specified on the plans, details or special provisions.
B. Gates shall be double swing or single swing as shown on the plans and be erected in conformance with ASTM F-900, Standard Specification for Industrial and Commercial Swing Gates.
   1. All gates shall have sufficient hardware and durability to withstand repeated cycles, fit to open and close without binding with allowance for hot and cold temperatures, and be lockable with a commercial grade heavy duty pad lock.
   2. Hinges shall be heavy duty steel and adjustable to provide smooth swing operation.
   3. Double swing gates shall have a drop rod or plunger bar that locks with the gate and prevents movement of the gate when closed. The receiving device in the roadway shall not extend above the roadway surface.
   4. Double gates shall have gate keepers that secure the gates when open. Gate keepers shall be a mechanical device attached to a galvanized steel pipe or beam 42" long and set in concrete.

2.06 CONCRETE

A. All concrete used shall have a minimum compressive strength of 4,000 psi at 28 days.

2.07 WINDSCREEN

A. Supplied by the owner.

PART 3 - EXECUTION

3.01 CHAIN LINK FENCING INSTALLATION

A. General:
   1. Construct fencing and gates at the location and height as shown on the plans and in accordance with the contract documents.
   2. Installation to conform to ASTM F 567.
   3. Construct all posts plumb in alignment, and with the top of fabric conforming to the proposed ground surface.
B. Posts:
   1. Post Spacing: Place posts in the line of the fence with equal spacing not to exceed 10 feet on center.
   2. Post Setting:
      a. Posts shall be set in a concrete foundation as specified on Standard Details.
      b. All posts are to be set plumb and shall be set not less than 24 hours prior to stretching the fabric.
      c. Top of footing to be 1 inch above grade and sloped to direct water away from posts. Footing to be uniform size full depth without flair at top of grade, to prevent frost heave.
      d. Gate post foundation shall be as specified on the Standard Detail Plates.
      e. All terminal, corner, angle, pull, and gate posts shall be set with the required brace-post assembly as shown on the Standard Detail Plates.
C. Rails:
   1. Top Rail: The top rail shall pass through the base of the line post caps and form a continuous brace from end to end of each stretch of fence. The top rail shall be securely fastened to the terminal posts by pressed steel connectors.
   2. Intermediate Rail (When Specified): The intermediate rail (when specified) shall be securely fastened between all line posts and terminal posts with pressed steel fasteners.
D. Braces:
   1. Braces shall be securely fastened to the post by means of malleable iron or pressed steel

connections, then trussed from the line post back to the end, gate, or corner post.
2. The diagonal tension rod (truss rod) shall be tightened to produce proper tension.

E. Pull Posts:
1. Pull posts shall be placed midway between end, angle, corner, and gate posts as necessary so that no section of fence longer than 300 feet shall be constructed with line posts only.
2. Pull post sizes shall conform to sizes defined as terminal posts.

F. Fabric
1. Pull fabric taut with bottom salvage a maximum of 1 inch above grade.
2. Each end of each run of chain link fabric shall be tightened and secured by a stretcher bar inserted in the final link of the fabric.
3. The length of the stretcher bar shall be the same as the width of the fabric. This bar and the tight fabric shall be secured to the end post by tension bands equally spaced not more than 15 inches apart.
4. The chain link fabric shall be attached securely to the braces top rail, bottom rail, and all intermediate posts at intervals of not more than 15 inches by wire ties or bands.
5. The ground surface along the line of the fence shall be uniformly smoothed for a width of 2 feet so that the fabric will conform to the ground surface.

G. Bottom Tension Wire (Not Applicable):
1. Bottom tension wire shall be stretched taut from terminal post to terminal post and securely fastened to each intermediate post 1 inch above the lower edge of fabric.
2. Tension wire shall be attached to the fence fabric with approved wire ties or clamps every 12 inches.

H. Gates: Gates shall be erected as shown on the plans and the Standard Detail Plates.

I. Electrical Grounds
1. Electrical grounds shall be constructed where a power line passes over the fence or at 500 foot intervals or at least one location, whichever is more restrictive.
2. The ground shall be accomplished with a copper-clad rod 8 feet long and a minimum of 5/8 inch in diameter driven vertically until the top is 6 inches below the ground surface.
3. A No. 6 solid copper conductor shall be clamped to the rod and to the fence in such a manner that each element of the fence is grounded.
4. Installation of ground rods shall not constitute a pay item and shall be considered incidental to fence construction.

3.02 REMOVAL AND REPLACEMENT OF EXISTING FENCES (Partial Removals Only)

A. Work Area: The work area for removal of existing fences shall include all property designated within the grading limits of the project.

B. Removal: The Contractor shall remove all specified fences or fence sections within work areas designated for new gates or revisions; unless otherwise shown on the plans or designated by the Engineer.
1. Remove fence to first line post beyond grading limits.
2. Removal of fencing includes all footings of posts.
3. Remove all concrete from posts prior to storing or reinstalling.
4. Removal of fencing shall be done in a careful manner for the salvaging of all materials; roll all fabric for storage.
5. Store all salvageable materials in a neat pile near the site, as approved by the Engineer.

C. Replacement
1. Replacement of fences as designated on plans or by the Engineer.
2. Replace any materials missing or damaged during removal operations with materials of equal or better quality than original fence materials.
3. Provide any additional fasteners, posts, and braces required to reconstruct the fence.
4. All fences adjacent to street right-of-way shall be replaced 6 inches behind the property line unless otherwise designated.
5. Existing posts set in concrete shall be reset in concrete.

D. Fences Removed and Not Designated for Replacement:
1. Salvaged material shall be the property of the property owner and shall be stored on this property.
2. If the property owner notifies the Contractor in writing that they do not want the salvaged material at the time of removal, remove the material from the project.

3. Replace materials damaged when it can be shown that the damage was caused by the Contractor's negligence; obtain concurrence of Engineer prior to fence removal.

3.03 TEMPORARY FENCE (Not Required by Contract)

A. Temporary fence is not required per the contract general conditions. At various locations it may be necessary to temporarily remove fences for access. These are to be replaced at the contractors expense when work is complete. If these are security fences, a temporary fence will be required during non-work hours.

3.04 CLEANUP

A. Perform cleanup operations during installation of work and upon completion of work.
B. Remove from site all excess materials, debris, and equipment.
C. Hose down and/or broom clean all paved surfaces.
D. Repair any damage resulting from fencing operations.

END OF SECTION

FENCING SUPPLEMENTAL

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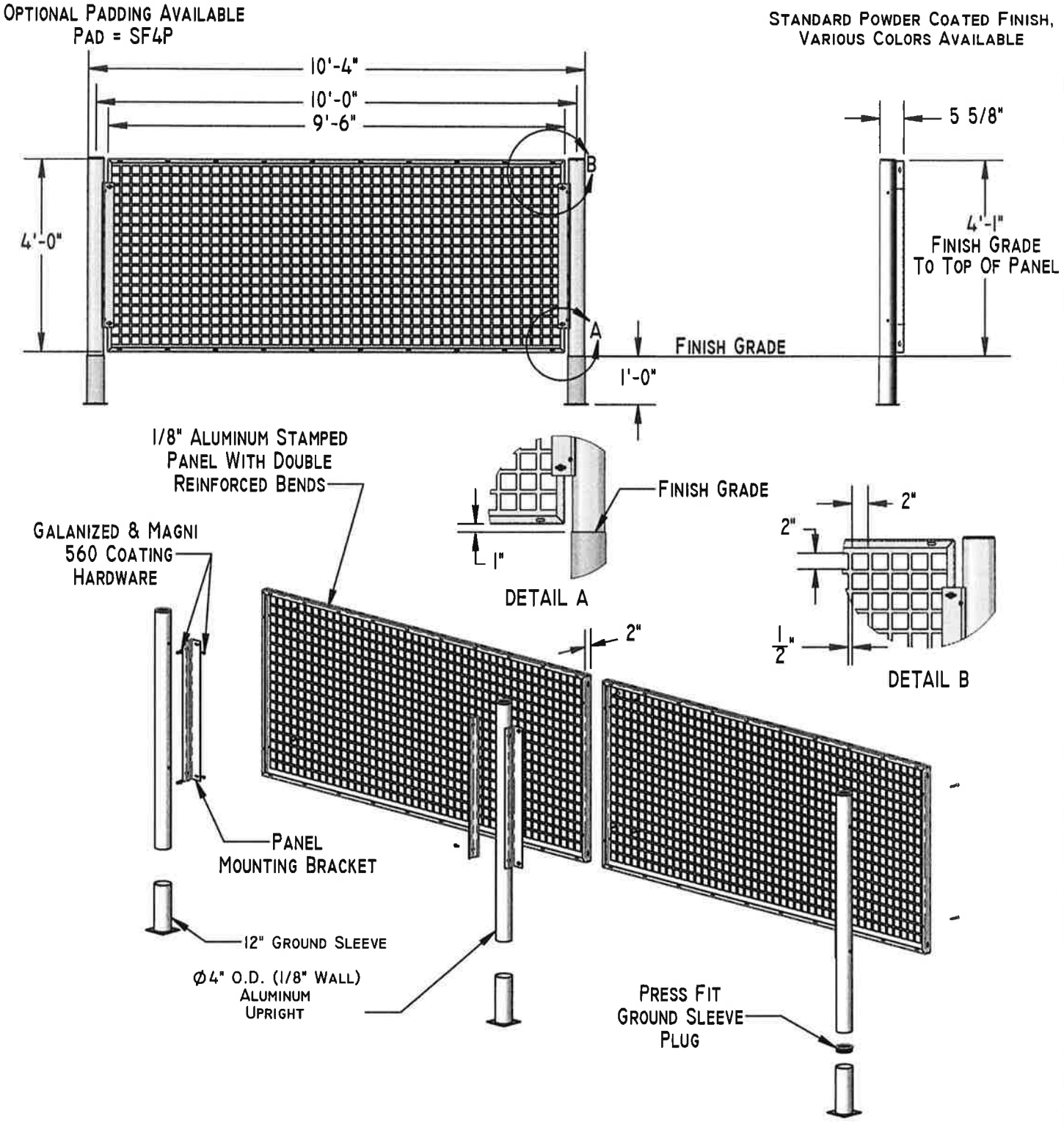


SF4 (LGSF4-SP)
SEMI-PERMANENT FENCING SYSTEM

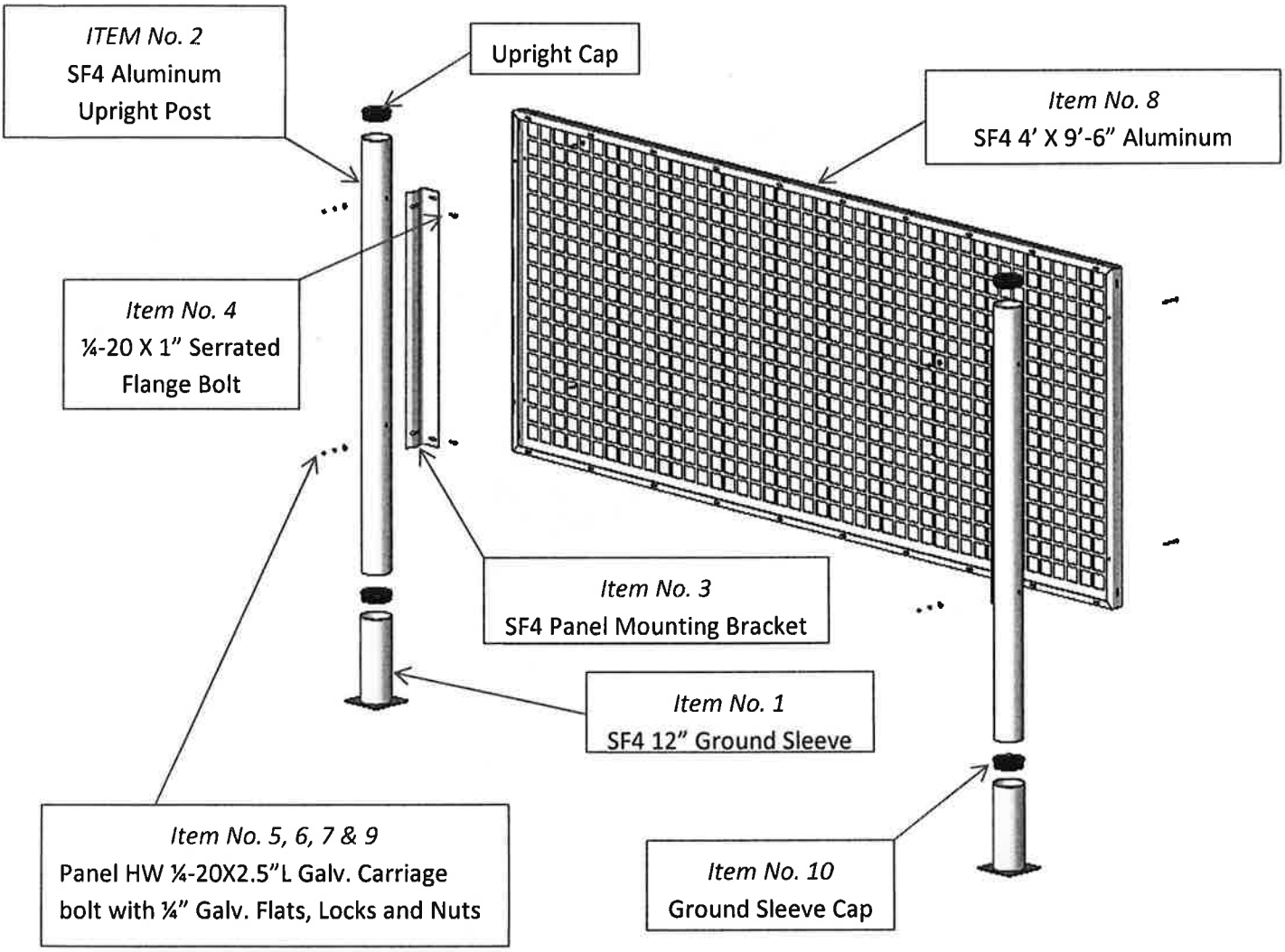
NOT TO SCALE

SPORTSFIELD SPECIALTIES INC 02162017

SportaFence

SF4 & SF6

Semi-Permanent Installation Notes

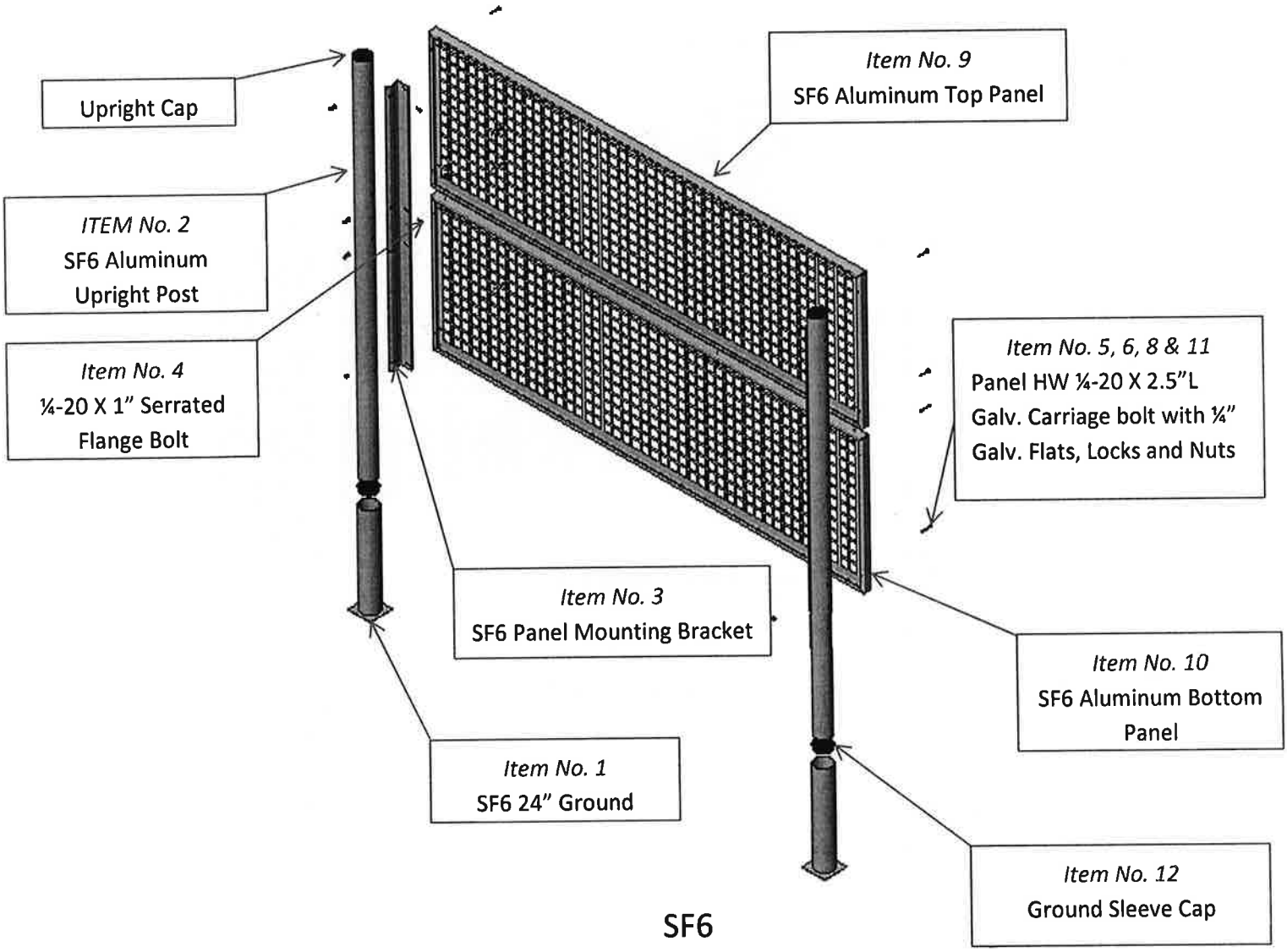


SF4

4' Semi-Permanent Fence

SF4 Hardware

ITEM NO.	SINGLE PANNEL ONLY/QTY.	PART NUMBER	DESCRIPTION
1	2	GS-04-12-NB	4.1" ID X 12" GROUND SLEEVE, NO BOLT
2	2	SF4SPP-UPRIGHT	UPRIGHT POST
3	2	SF4SPP-02	PANEL MOUNT BRACKET
4	4	100_HWHI_4_20XI_SER_CS_BP	1/4-20 X 1" HEX WASHER HEAD WITH SERRATED FLANGE, GRADE 5, FULLY THREADED
5	4	111-FLWI_4-GALV	1/4 GALV. FLAT WASHER
6	4	111-SLWI_4-GALV	1/4 GALV. LOCK WASHER
7	4	102-CABI_4-20X2.50-GALV	1/4-20 X 2.50" L, GALV. CARRIAGE BOLT
8	1	LGSF-PANEL	4' X 9-1/2' PANEL
9	4	108-HXNI_4-20-STL	1/4-20 GALV. HEX NUT
10	2	114-GS-04-CAP-4.30D	PLASTIC END CAP (FITS 4" O.D. X 1/8" WALL)



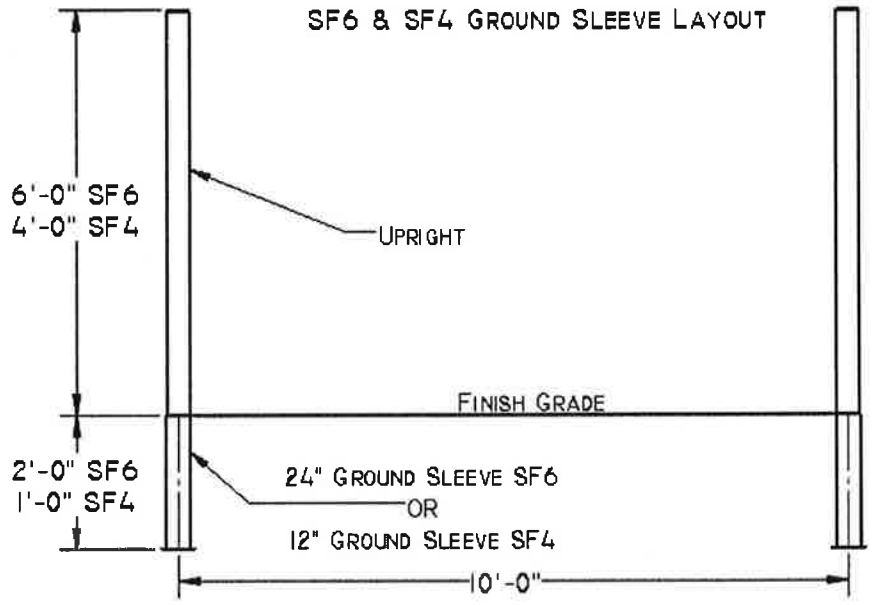
SF6

6' Semi-Permanent Fence

SF6 Hardware

ITEM NO.	SINGLE PANNEL ONLY/QTY.	PART NUMBER	DESCRIPTION	MATERIAL
1	2	GS-04-24-NB	4.1" ID x 24" GROUND SLEEVE, NO BOLT	ALUMINUM
2	2	LGSFSP6-UPRIGHT	UPRIGHT POST	4" OD x .125" WALL ALUM ROUND TUBE
3	2	LGSFSP6-02	PANEL MOUNT BRACKET	.125" ALUM SHEET
4	16	100_HWHI_4_20XI_SER_G5_BP	1/4-20 x 1" HEX WASHER HEAD WITH SERRATED FLANGE, GRADE 5, FULLY THREADED	STEEL
5	12	111-FLWI_4-GALV	1/4 GALV. FLAT WASHER	STEEL
6	8	102-CABI_4-20X2.50-GALV	1/4-20 x 2.50" L, GALV. CARRIAGE BOLT	STEEL
7	4	100-HHCL_4-20X.750-STL-G5	1/4-20 x .75" ZINC STEEL HEX HEAD BOLT, GRADE 5	STEEL
8	12	111-SLWI_4-GALV	1/4 GALV. LOCK WASHER	STEEL
9	1	LGSFSP6-PANEL-TOP	SF6 TOP PANEL	.125" ALUM SHEET
10	1	LGSFSP6-PANEL-BOTTOM	SF6 BOTTOM PANEL	.125" ALUM SHEET
11	12	105-HXNI_4-20-STL	1/4-20 GALV. HEX NUT	STEEL
12	2	114-GS-04-CAP-4.30D	PLASTIC END CAP (FITS 4" O.D. x 1/8" WALL)	PLASTIC

Pole



Ground Sleeve Layout and Installation

Figure 1.

1. Locate ground sleeve location as per the engineered drawings, and mark location on the field.

2. Excavate hole for footer and set a concrete form. Refer to local building codes for exact footer dimensions, as local soil conditions will vary.
3. Center the ground sleeve in the form using supplied Ground Sleeve fixture and secure it in a plumb and level position. The top of the ground sleeve should be flush with the finished grade.
4. Pour concrete foundation and allow concrete to fully cure, and backfill.
5. Insert pole into ground sleeve
6. Repeat this process for all remaining ground sleeves and poles. (Figure 1)

SF4 Panel Assembly

See above exploded view of SF4 fence.

1. Begin by installing the panel mounting brackets to the uprights using four ¼-20 X 1" serrated flange bolts that thread into the rivet-nut located in the side of the upright.
2. Position the 4' X 9'-6" panel mounting holes and align with the panel mounting bracket slots and install four ¼-20 X 2.5" long galvanized carriage bolts with one each galvanized flat, lock washers and nut per carriage bolt.
3. Tighten all hardware after panels are installed to desired position.

SF6 Panel Assembly

See above exploded view of SF6 fence.

1. Begin by installing the panel mounting brackets to the uprights using eight ¼-20 X 1" serrated flange bolts that thread into the rivet-nut located in the side of the upright. (Figure 2)
2. Position the 35.5" X 9'-6" bottom panel with the holes on the top surface of the panel facing up (slots in bottom surface face toward the finish grade) and align with the lower 2 slots on the mounting bracket and install four ¼-20 X 2.5" long galvanized carriage bolts with one each galvanized flat, lock washers and nut per carriage bolt. (Figure 3)
3. Position the 35.5" X 9'-6" top panel with the slotted holes on the bottom surface of the panel facing down (slots in bottom surface face toward the finish grade) and align with the Upper 2 slots on the mounting bracket and install four ¼-20 X 2.5" long galvanized carriage bolt with one each galvanized flat, lock washers and nut per carriage bolt. (Figure 4)
4. With the two panels assembled to the mounting brackets, install the four galvanized ¼20 X .75" long hex head bolt with one each galvanized flat, lock washers and nut to the mating surface of the top and bottom panels. (Figure 4)

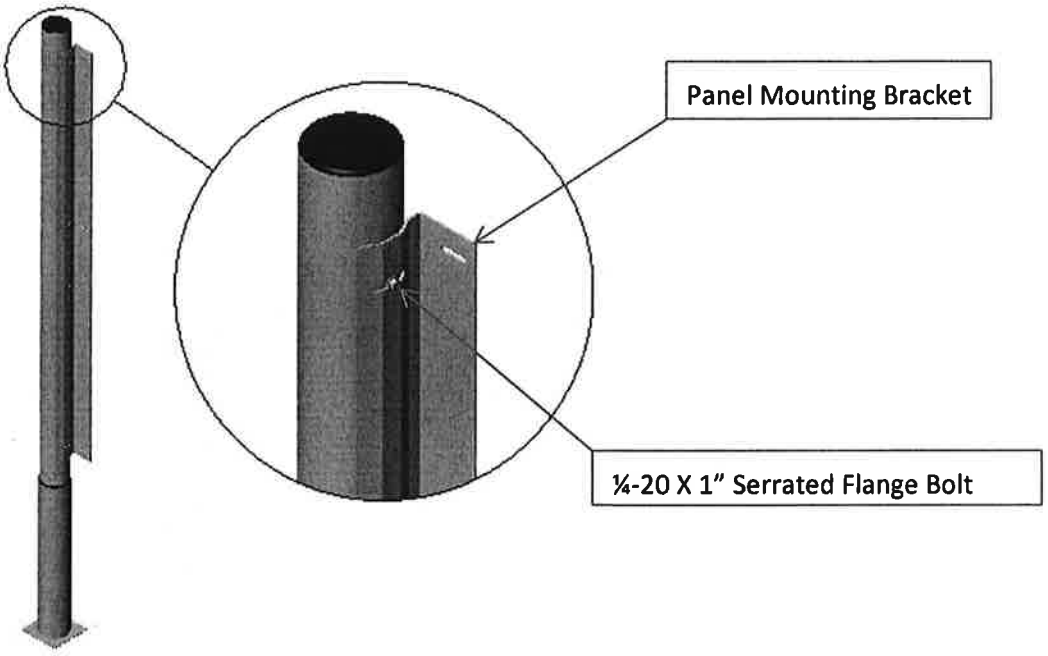


Figure 2

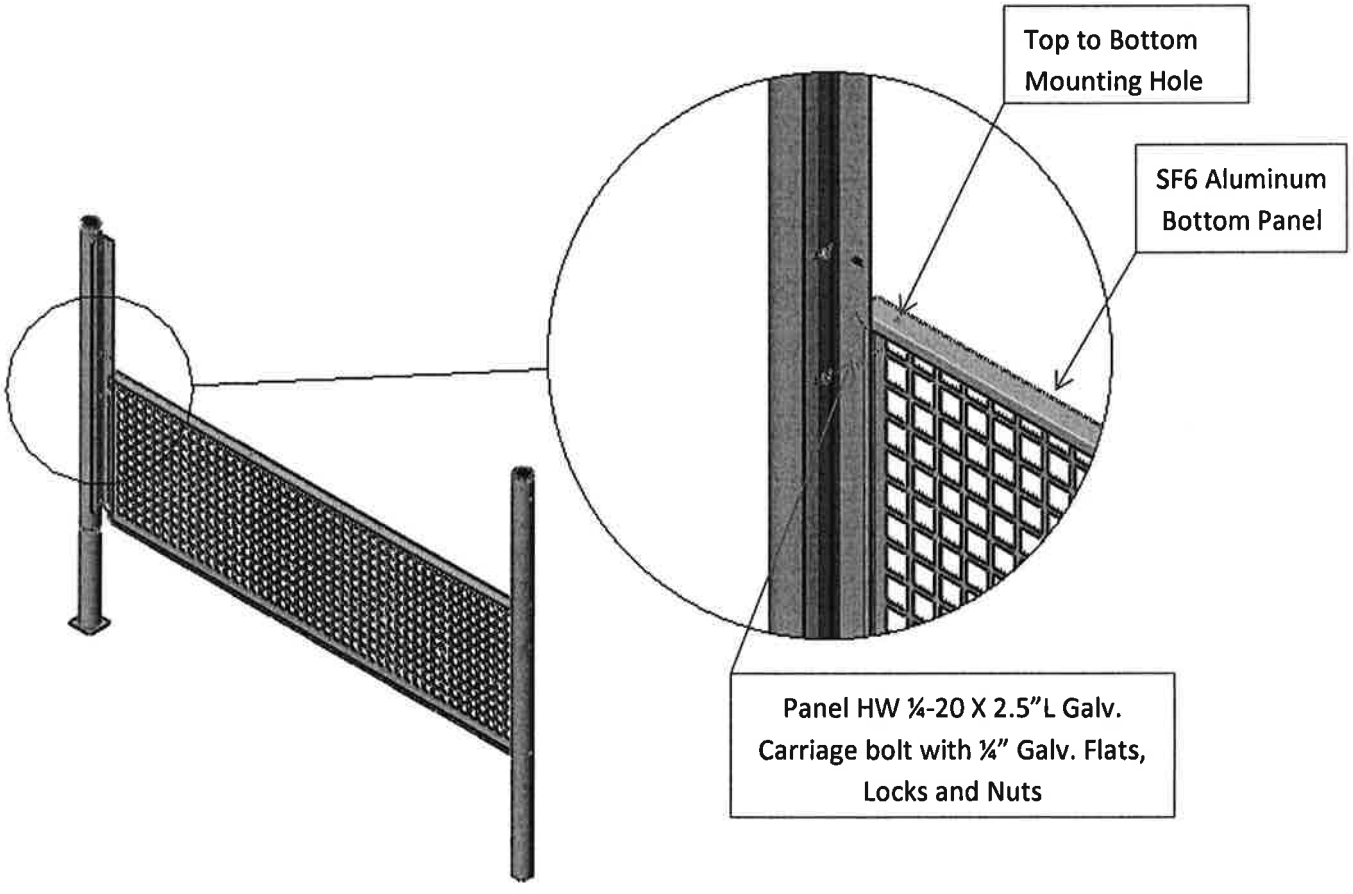


Figure 3

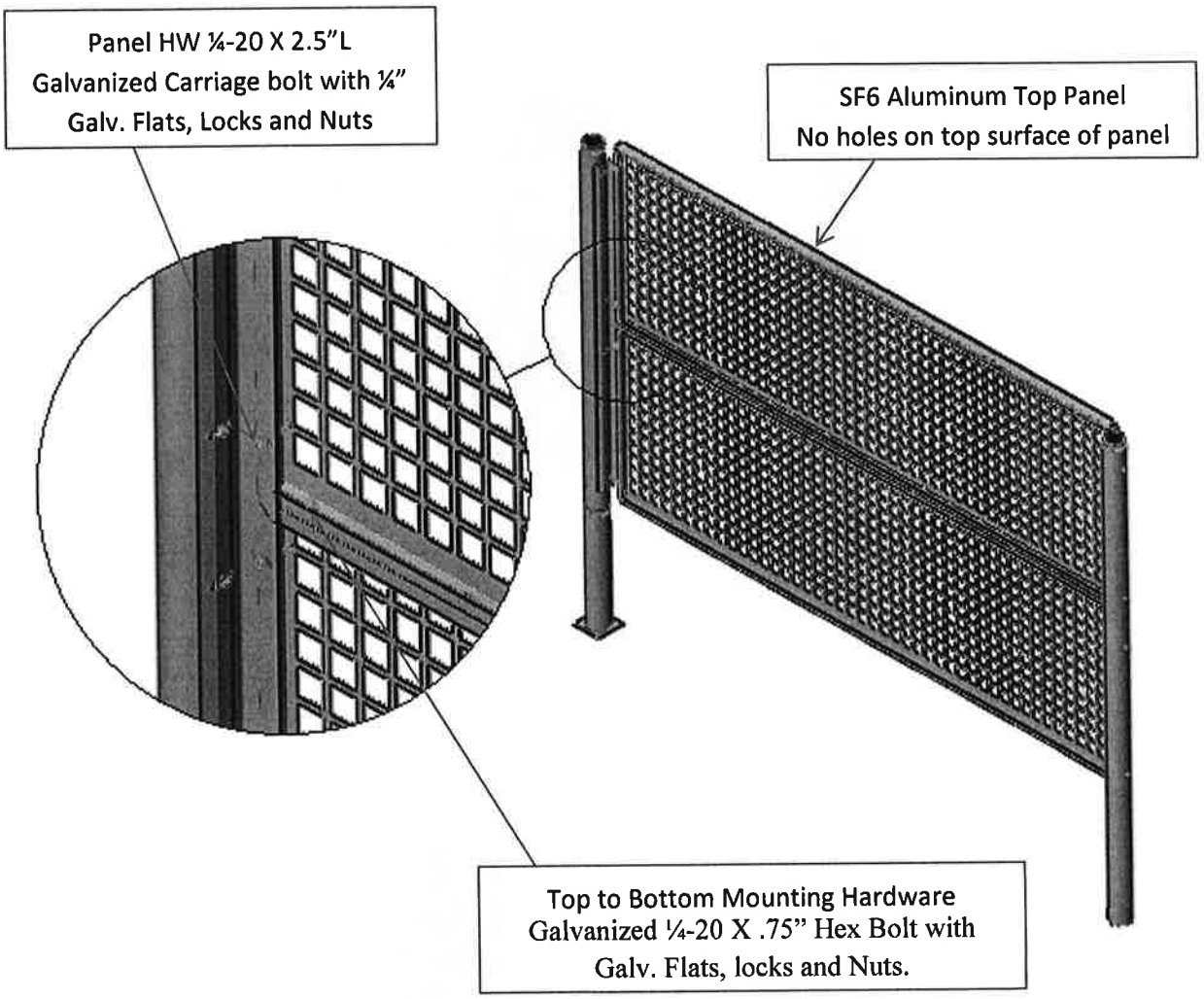


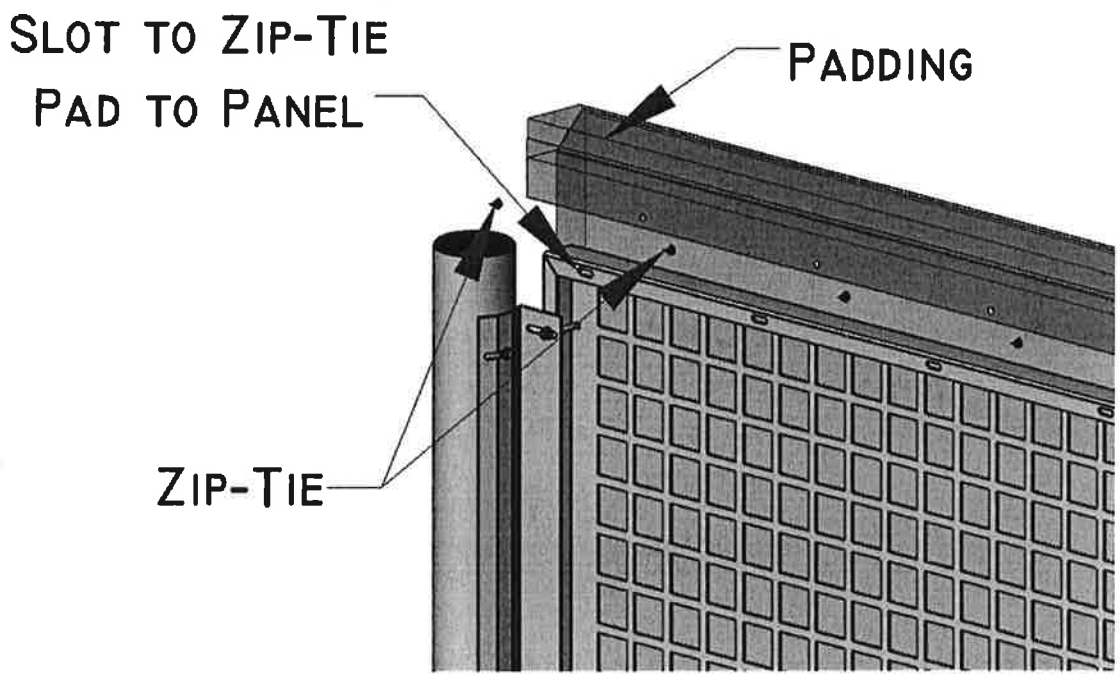
Figure 4

Panel section is fully assembled.
Tighten All Hardware once all panels are in final position.

Padding to Panels

1. The SportaFence panel assembly provides fastening features for the installation of the padding (if supplied).

2. To Install the Padding, place each section of padding over the fence panel assembly and install a Zip Tie (12 Zip Ties per padding section) through the pad mounting holes and the slots provided in the at the top and bottom of the panel sections. Secure each Zip Tie and remove the excess material if desired.
3. Repeat this process for the remaining sections.



REPLACEMENT PARTS

Contact Sportsfield Specialties Customer Service at 1-888-975-3343 for replacement hardware.

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