SECTION 32 31 00

DECORATIVE METAL FENCES AND GATES

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\*\* NOTE TO SPECIFIER \*\* Fortress Fence Products; fence and gate systems.
This section is based on the products of Fortress Fence Products, which is located at:1720 N. First St.Garland, TX 75040Toll Free Tel: 866-323-4766Email: [request info (Specifications@fortressbp.com)](https://arcat.com/rfi?action=email&company=Fortress%252BFence%252BProducts&message=RE%253A%2520Spec%2520Question%2520(02820for)%253A%2520&coid=49638&spec=02820for&rep=&fax=)
Web: <http://www.fortressfence.com>
 [ [Click Here](https://arcat.com/company/fortress-fence-products-49638) ] for additional information.
Fortress Fence Products, a division of The Fortress Company, is solely focused on developing, manufacturing and marketing innovative products specifically for the fence industry. Its diverse product offerings, superior coating and quality manufacturing have led the fence industry towards improvement and advancement. Fortress Fence Products offers a complete line of fence solutions for any residential, commercial or industrial project needs.

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Ornamental welded steel fence system. (Classic Commercial)
		2. Ornamental welded steel fence system. (Classic Residential)
		3. Ornamental welded steel fence system. (Estate)
		4. Ornamental rackable welded steel fence system. (Versai (V2) Commercial)
		5. Ornamental rackable welded steel fence system. (Versai Residential)
		6. Ornamental rackable welded steel fence system. (Versai Assurance (V2) Commercial)
		7. Ornamental rackable welded steel fence system. (Versai Assurance Residential)
		8. Ornamental rackable welded steel fence system. (Versai (V3) Industrial)
		9. Ornamental rackable mechanically locked fence system. (Titan Industrial)
		10. Ornamental rackable mechanically locked fence system. (Titan Commercial)
		11. Ornamental rackable aluminum fence system (A2 Commercial)
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this Project; add others as required.

* + 1. Section 03 30 00 - Cast-in-Place Concrete.
		2. Section 31 10 00 - Site Clearing.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American Society for Testing and Materials International (ASTM).
			1. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
			2. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
			3. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
			4. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
			5. ASTM D523 - Standard Test Method for Specular Gloss.
			6. ASTM D714 - Standard Test Method for Evaluating Degree of Blistering of Paints.
			7. ASTM D822 - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
			8. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
			9. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
			10. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
			11. ASTM D3359 - Standard Test Methods for Measuring Adhesion by Tape Test.
			12. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
			13. ASTM F1908 - Standard Guide for Fences for Residential Outdoor Swimming Pools, Hot Tubs, and Spas.
			14. ASTM F2049 - Standard Safety Performance Specification for Fences/Barriers for Public, Commercial, and Multi-Family Residential Use Outdoor Play Areas.
			15. ASTM F2408 - Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets.
			16. ASTM F2957 - Standard Specification for Ornamental Aluminum Fence Systems.
		2. American Welding Society (AWS): AWS D1.1 - Structural Welding Code - Steel

\*\* NOTE TO SPECIFIER \*\* Delete this reference if NOT specifying a Versai Commercial or Residential panel with 3" airspace.

* + 1. U.S. Consumer Product Safety Commission (CPSC). 2008. Public playground safety handbook. Bethesda, MD: CPSC. http://www.spcs.gov/cpscpub/pubs/325.pdf
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Manufacturer's printed product information indicating material compliance and specified options are to be submitted prior to installation. Submit manufacturer's product data sheets on each product to be used.
		3. Shop drawings shall include plans, elevations, sections, details, and attachments to other work. Drawings must be submitted for approval and be approved prior to installation.
		4. Design data which verifies compliance with design loads specified in Performance Requirements Article. Design data shall be signed and sealed by the qualified professional engineer responsible for their preparation.
		5. Submit samples for initial color selection. Submit samples of each specified finish.
	2. QUALITY ASSURANCE
		1. Manufacturing company with engineering and fabrication of custom fencing and gate systems for a minimum of 15 years.
		2. Installation company with experienced in manufacturer's products for a minimum of 5 years. The Contractor shall provide trained laborers with prior experience in the type of construction involved as well as experience installing the materials and techniques specified.
		3. Obtain each fence system and gates through one source from a single manufacturer.
	3. DELIVERY, STORAGE, AND HANDLING
		1. Upon delivery to the jobsite, inspect all materials for damage that might have occurred during shipment.
		2. Handle and store materials in manufacturer's packaging until materials are ready to be installed. Store materials in such a way as to prevent damage and theft.
	4. PROJECT CONDITIONS
		1. Verify actual locations of walls and other construction contiguous with fencing and gates by field measurements before fabrication and indicate measurements on shop drawings. Provide allowance for trimming and fitting onsite.
	5. COORDINATION AND SCHEDULING
		1. Coordinate installation of anchorages for fencing and gates. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in concrete or masonry. Deliver such items to the Project Site in time for installation.
		2. Schedule installation so wall attachments are made only to completed walls. Do not support systems temporarily by any means that do not satisfy structural performance requirements.
	6. WARRANTY

\*\* NOTE TO SPECIFIER \*\* Applies to Classic, Estate Series. Delete if not required.

* + 1. Manufacturer's Warranty: Provide manufacturer's standard 10 year limited warranty, from the date of purchase, against defects in materials and workmanship including protection against cracking, peeling, blistering, and corrosion (rusting).

\*\* NOTE TO SPECIFIER \*\* Applies to Titan and Versai Series. Delete if not required.

* + 1. Manufacturer's Warranty: Provide manufacturer's standard 20 year limited warranty, from the date of purchase, against defects in materials and workmanship including protection against cracking, peeling, blistering, and corrosion (rusting).

\*\* NOTE TO SPECIFIER \*\* Applies to V3 Series. Delete if not required.

* + 1. Fortress Fence Products V3 materials include a 20-year limited warranty, from the date of purchase, for defects in material and workmanship, including protection against cracking, peeling, blistering and corrosion (rusting). Refer to 20 Year Warranty Sheet.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Fortress Fence Products, which is located at:1720 N. First St.Garland, TX 75040Toll Free Tel: 866-323-4766Email: [request info (Specifications@fortressbp.com)](https://arcat.com/rfi?action=email&company=Fortress%252BFence%252BProducts&message=RE%253A%2520Spec%2520Question%2520(02820for)%253A%2520&coid=49638&spec=02820for&rep=&fax=);Web: <http://www.fortressfence.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
	1. SITE FENCING AND GATES

\*\* NOTE TO SPECIFIER \*\* The following sections include all of the fence systems offered by Fortress. Delete any fence system not in the project scope of work. If there is more than one type of fence system on your project, specify the location of each on the drawings.

* + 1. Ornamental Welded Steel Fence Systems:

\*\* NOTE TO SPECIFIER \*\* Classic Commercial Fence Systems. Select fence panel style, delete all others. Delete section if not required.

* + - 1. Basis of Design: Classic Commercial Fence Systems as manufactured by Fortress Fence Products, a division of The Fortress Company.
				1. Style: As indicated on the Drawings.
				2. Style: Extended Picket (EXT).
				3. Style: Plain Iron Panel (PIP).
				4. Style: Spear Point Picket (SP).
				5. Fence Panels: Fabricated in standard length of 90-1/2 inches (2299 mm).

\*\* NOTE TO SPECIFIER \*\* Delete heights not required.

Height: As indicated on the Drawings.

Height: 46 inch (1168 mm).

Height: 58 inch (1473 mm).

Height: 70 inch (1778 mm).

* + - * 1. Materials:

Rails and pickets shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653 and have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653.

Posts shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653, have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653, and have a powder-coated factory finish.

* + - * 1. Components:

Rails: 1-1/2 inch (38 mm) square, 16 gauge.

Pickets: 3/4 inch (19 mm) square, 19 gauge.

\*\* NOTE TO SPECIFIER \*\* Select post size for Classic Commercial Fence Systems. Delete post size required.

Posts: 2-1/2 inch (63.5 mm) square, 16 gauge.

Posts: 3 inch (76 mm) square, 14 gauge.

\*\* NOTE TO SPECIFIER \*\* Delete if gates not required.

* + - * 1. Gates: Provide manufacturer's standard gates and hardware.
				2. Fabrication:

\*\* NOTE TO SPECIFIER \*\* Option below applies to Classic Commercial Fence Systems. Delete heights not selected above.

Fence Panels: Fabricated in standard length of 90-1/2 inches (2299 mm). Comply with requirements indicated for materials, thickness, design and details of construction.

Welded connections shall comply with AWS standards for recommended practice in shop welding.

Components shall be accurately cut and drilled to receive hardware, fasteners, and accessories.

Fence panel shall be capable of meeting structural test load capabilities for a commercial fence system referenced in table 2 of ASTM 2409.

Fence panel shall be capable of meeting coating performance requirements in table 3 of ASTM 2409.

\*\* NOTE TO SPECIFIER \*\* Classic Residential Fence Systems. Select fence panel style, delete all others. Delete section if not required.

* + - 1. Basis of Design: Classic Residential Fence Systems as manufactured by Fortress Fence Products, a division of The Fortress Company.
				1. Style: As indicated on the Drawings.
				2. Style: Extended Picket (EXT).
				3. Style: Plain Iron Panel (PIP).
				4. Style: Spear Point Picket (SP).
				5. Fence Panels: Fabricated in standard length of 90-1/2 inches (2299 mm).

\*\* NOTE TO SPECIFIER \*\* Delete heights not required.

Height: As indicated on the Drawings.

Height: 46 inch (1168 mm).

Height: 58 inch (1473 mm).

Height: 70 inch (1778 mm).

* + - * 1. Materials:

Rails and pickets shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653 and have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653.

Posts shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653, have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653, and have a powder-coated factory finish.

* + - * 1. Components:

Rails: 1 inch (25 mm) square, 17 gauge.

Pickets: 5/8 inch (16 mm) square, 20 gauge.

Posts: 2 inch (51 mm) square, 16 gauge.

\*\* NOTE TO SPECIFIER \*\* Delete if gates not required.

* + - * 1. Gates: Provide manufacturer's standard gates and hardware.
				2. Fabrication:

\*\* NOTE TO SPECIFIER \*\* Option below applies to Classic Residential Fence Systems. Delete heights not selected above.

Fence Panels: Fabricated in standard length of 90-1/2 inches (2299 mm). Comply with requirements indicated for materials, thickness, design and details of construction.

Welded connections shall comply with AWS standards for recommended practice in shop welding.

Components shall be accurately cut and drilled to receive hardware, fasteners, and accessories.

Fence panel shall be capable of meeting structural test load capabilities for a residential fence system referenced in table 2 of ASTM 2409.

Fence panel shall be capable of meeting coating performance requirements in table 3 of ASTM 2409.

\*\* NOTE TO SPECIFIER \*\* Estate Privacy Fence Systems. Delete section if not required.

* + - 1. Basis of Design: Estate Privacy Fence Systems as manufactured by Fortress Fence Products, a division of The Fortress Company.
				1. Materials:

Rails and pickets shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653 and have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653.

Posts shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653, have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653 and have a powder-coated factory finish.

* + - * 1. Components:

Rails: 1-1/2 inch (38 mm) square, 16 gauge.

Pickets and Attachment Bars: 3/4 inch (19 mm) square, 19 gauge.

Posts: 3 inch (76 mm) square, 14 gauge.

\*\* NOTE TO SPECIFIER \*\* Delete if gates not required.

* + - * 1. Gates: Provide manufacturer's standard gates and hardware.
				2. Fabrication:

Fence Panels: Fabricated in standard length of 94-7/8 inches (2410 mm) to hold 15 each 5-1/2 inch (140 mm) boards. Panels shall be 75-1/8 inch (1908 mm) high to hold 72 inch (1829 mm) boards. Panels shall comply with requirements indicated for materials, thickness, design, and details of construction.

Welded connections shall comply with AWS standards for recommended practice in shop welding.

Components shall be accurately cut and drilled to receive hardware, fasteners, and accessories.

Fence panel shall be capable of meeting structural test load capabilities for a residential fence system referenced in table 2 of ASTM 2409.

Fence panel shall be capable of meeting coating performance requirements in table 3 of ASTM 2409.

\*\* NOTE TO SPECIFIER \*\* Finish section applies to Estate, Classic Residential, Classic Commercial Fence Systems. Delete section if one of these fence systems is not required.

* + - 1. Finish:
				1. Materials are coated with the Fortress Guard process including galvanization, zinc phosphate, and architectural grade powder coat.
				2. Metal parts shall be assembled and finished individually prior to shipment.
				3. Galvanized steel fence components shall be cleaned with a non-petroleum solvent followed by the application of a sealing zinc phosphate coating.
				4. Immediately after sealing, a powder finish coating is applied by the electrostatic spray process. This consists of a thermosetting carboxyl polyester resin top coat with a minimum dry film thickness of 50 microns.

\*\* NOTE TO SPECIFIER \*\* The following tables are applicable to Versai Commercial only, and provide design guidance on post sizes and spacing. Delete if not required.

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| Minimum Post Sizes for Versai (V2) Commercial  |

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| Line of Fence Posts | Panel Heights |
| 2.5" x 16ga | Up to & Including 6' height |
| 2.5" x 14ga | 7' & 8' |

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| Versai (V2) Commercial Post Spacing by Bracket Type  |

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| Style | Flat Top, Spear Top, Extended Picket and Curved Top 8' Nominal (90.5" Rail) |
| Bracket Types | One Direction Flat Mount (EX-106), for 2-1/2" post size |
|  | One Direction Flat Mount (EX-106), for 3" post size, 95.5" post setting |
|  | Two Direction Line (EX-206), for 2-1/2" post size, 95" post setting |
|  | Three Direction Universal (EX-306), for 2-1/2" post size, 95" post setting |
|  | Swivel Flat Mount (EXS-106), for 2-1/2" post size, 95" post setting |
|  | Swivel Flat Mount (EXS-106), for 3" post size, 95.5" post setting |

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| Versai (V2) Commercial Gate Posts Sizes |

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| Gate Leaf |  | Gate Height |  |
|  | Up to & Including 4' | Over 4' Up to & Including 6'  | 7' & 8' |
| Up to 4' | 2.5" x 14ga | 3" x 12ga | 3" x 12ga |
| 4'1" to 6' | 3" x 12ga | 3" x 12ga | 4" x 11ga |
| 6'1" to 8' | 3" x 12ga | 4" x 11ga | 4" x 11ga |

* + 1. Ornamental Rackable Welded Steel Fence Systems:

\*\* NOTE TO SPECIFIER \*\* Versai (V2) Commercial Fence Systems. Select fence panel style, delete all others. Delete section if not required.

* + - 1. Basis of Design: Versai (V2) Commercial Fence Systems as manufactured by Fortress Fence Products, a division of The Fortress Company.
				1. Style: As indicated on the Drawings.
				2. Style: Flat Top, Extended Bottom (FT).
				3. Style: Flat Top, Flat Bottom (FT/FB).
				4. Style: Flat Top, Flat Bottom (PL) for Swimming Pool installations
				5. Style: Extended Top, Extended Bottom (EXT).
				6. Style: Extended Top, Flat Bottom (EXT/FB).
				7. Style: Spear Point Top, Extended Bottom (SP).
				8. Style: Spear Point Top, Flat Bottom (SP/FB).
				9. Style: Curve Top, Extended Bottom (CT).
				10. Style: Curve Top, Flat Bottom (CT/FB).

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai (V2) Commercial Fence Systems. Select either 2 or 3 rail panel design. The PL style is only available with 3 rails. Contact Specifications@FortressFence.com for additional rail options.

* + - * 1. Rails: 2.
				2. Rails: 3.
				3. Fence Panels: Fabricated in standard length of 90-1/2 inches (2299 mm).

\*\* NOTE TO SPECIFIER \*\* Delete heights not required.

Height: As indicated on the Drawings.

Height: 34 inch (864 mm).

Height: 40 inch (1016 mm).

Height: 46 inch (1168 mm).

Height: 54 inch (1372 mm).

Height: 58 inch (1473 mm).

Height: 70 inch (1778 mm).

Height: 82 inch (2083 mm).

Height: 94 inch (2388 mm).

* + - * 1. Airspace Between Pickets, Versai (V2) Commercial: 3-15/16 inch.
				2. Materials:

Rails shall be cold-rolled steel formed U-channel and pickets shall be cold-rolled steel formed and welded tubing, both having a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653 and have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653.

Posts shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653, have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653, and have a powder-coated factory finish.

* + - * 1. Components:

Rails: 1-9/16 inch (40 mm) by 1-3/16 inch (30 mm) (Leg x Web), 14 gauge.

Pickets:

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai (V2) Commercial Fence Systems. Delete this section is not specifying one of the following heights: 34", 40", 46", 54", 58", and 70".

3/4 inch (19 mm) square, 16 gauge.

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai (V2) Commercial Fence Systems. Delete this section is not specifying one of the following heights: 82" and 94".

3/4 inch (19 mm) square, 14 gauge.

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai (V2) Commercial Fence Systems. Delete posts not required.

* + - * 1. Posts: 2-1/2 inch (64 mm) square, 16 gauge.
				2. Posts: 2-1/2 inch (64 mm) square, 14 gauge.
				3. Posts: 2-1/2 inch (64 mm) square, 12 gauge.
				4. Posts: 3 inch (76 mm) square, 14 gauge.
				5. Posts: 3 inch (76 mm) square, 12 gauge.

\*\* NOTE TO SPECIFIER \*\* Delete if gates not required.

* + - * 1. Gates: Provide manufacturer's standard gates and hardware.
				2. Fabrication:

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai (V2) Commercial Fence Systems. Delete heights not selected above.

* + - * 1. Fence panels shall be fabricated in standard length of 90-1/2 inches (2299 mm). Comply with requirements indicated for materials, thickness, design, and details of construction.
				2. Pickets are welded to the rails with a patented pin hinge system which allows the panel to rake without metal fatigue or damage to the finish.
				3. Welded connections shall comply with AWS standards for recommended practice in shop welding.
				4. Components shall be accurately cut and drilled to receive hardware, fasteners, and accessories.
				5. Panels shall be rackable to an 18 degree change in grade (30 inch vertical travel per panel).
				6. Fence panel shall be capable of meeting structural test load capabilities for a commercial fence system referenced in table 2 of ASTM 2409.
				7. Fence panel shall be capable of meeting coating performance requirements in table 3 of ASTM 2409.

\*\* NOTE TO SPECIFIER \*\* The following tables are applicable to Versai Residential only, and provide design guidance on post sizes and spacing. Delete if not required.

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| Minimum Post Sizes for Versai Residential |

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| Line of Fence Posts | Panel Heights |
| 2" x 16ga | Up to & Including 6' height |

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| Versai Residential Post Spacing by Style and Bracket Type |

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| Style | Flat Top Flat Bottom, Flat Top, Pressed Spear, Extended Picket |
| Bracket Types | Omni-104, for 2" post size, 93.5" +/- 1/2" post setting |
|  | One Direction Flat Mount (EX-104), for 2" post size, 93.5" +/- 1/2" post setting |
|  | Two Direction Line (EXW-104), for 2" post size, 93.5" +/- 1/2" post setting |
|  | Three Direction Universal (EXW-304), for 2" post size, 93.5" +/- 1/2" post setting |
|  | Swivel Flat Mount (EXS-104), for 2" post size, 94.75" +/- 1/2" post setting |

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| Versai Residential Post Spacing by Style and Bracket Type |

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| Style | Flat Top Flat Bottom, Flat Top, Pressed Spear, Extended Picket |
| Bracket Types | One Direction Flat Mount (EX-104 96"OC) for 2" post size, 95.25" +/- 1/2" post setting |
|  | Two Direction Line (EXW-104 96"OC) for 2" post size, 95.25" +/- 1/2" post setting |
|  | Three Direction Universal (EXW-304 96"OC) for 2" post size, 95.25" +/- 1/2" post setting |

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| Versai Residential Gate Posts Sizes |

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| Gate Leaf | Gate Height, Up to & Including 6 |
| Up to 5'  |  2" x 16ga |
| 6' to 8' | 2.5" x 16ga |

* + - 1. Basis of Design: Versai Residential Fence Systems as manufactured by Fortress Fence Products, a division of The Fortress Company.
				1. Style: As indicated on the Drawings.
				2. Style: Flat Top, Extended Bottom (FT).
				3. Style: Flat Top, Flat Bottom (FT/FB).
				4. Style: Flat Top, Flat Bottom (PL) for Swimming Pool installations
				5. Style: Extended Top, Extended Bottom (EXT).
				6. Style: Extended Top, Flat Bottom (EXT/FB).
				7. Style: Spear Point Top, Extended Bottom (SP).
				8. Style: Spear Point Top, Flat Bottom (SP/FB)

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai Residential Fence Systems. Select either 2 or 3 rail panel design. The PL style is only available with 3 rails.

* + - * 1. Rails: 2.
				2. Rails: 3.
				3. Fence Panels: Fabricated in standard length of 90-1/2 inches (2299 mm).

\*\* NOTE TO SPECIFIER \*\* Delete heights not required.

Height: As indicated on the Drawings.

Height: 34 inch (864 mm).

Height: 40 inch (1016 mm).

Height: 46 inch (1168 mm).

Height: 48 inch (1219 mm).

Height: 54 inch (1372 mm).

Height: 58 inch (1473 mm).

Height: 70 inch (1778 mm).

* + - * 1. Airspace Between Pickets, Versai Residential: 3 inches (76 mm).
				2. Materials:

Rails shall be cold-rolled steel formed U-channel and pickets shall be cold-rolled steel formed and welded tubing, both having a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653 and have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653.

Posts shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653, have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653, and have a powder-coated factory finish.

* + - * 1. Components:

Rails: 1-3/16 inch (30 mm) by 1 inch (25 mm) (Leg x Web), 16 gauge.

Pickets: 5/8 inch (16 mm) square, 18 gauge.

Posts: 2 inch (51 mm) square, 16 gauge.

Fasteners: Nuts, bolts, sheet metal screws, ASTM F 593 stainless steel.

\*\* NOTE TO SPECIFIER \*\* Delete if gates not required.

* + - * 1. Gates: Provide manufacturer's standard gates and hardware.
				2. Fabrication:

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai Residential Fence Systems. Delete heights not selected above.

Fence panels shall be fabricated in standard length of 90-1/2 inches (2299 mm). Comply with requirements indicated for materials, thickness, design, and details of construction.

Pickets are welded to the rails with a patented pin hinge system which allows the panel to rake without metal fatigue or damage to the finish.

Welded connections shall comply with AWS standards for recommended practice in shop welding.

Components shall be accurately cut and drilled to receive hardware, fasteners, and accessories.

Panels shall be rackable to a 30 degree change in grade (48 inch vertical travel per panel).

Fence panel shall be capable of meeting structural test load capabilities for a residential fence system referenced in table 2 of ASTM 2409.

Fence panel shall be capable of meeting coating performance requirements in table 3 of ASTM 2409.

\*\* NOTE TO SPECIFIER \*\* Versai Assurance (V2) Commercial Fence Systems. Select fence panel style, delete all others. Delete section if not required.

* + - 1. Basis of Design: Versai Assurance (V2) Commercial Fence Systems as manufactured by Fortress Fence Products, a division of The Fortress Company.
				1. Style: As indicated on the Drawings.
				2. Style: Flat Top, Extended Bottom (FT).
				3. Style: Flat Top, Flat Bottom (FT/FB).
				4. Style: Flat Top, Flat Bottom (PL) for Swimming Pool installations
				5. Style: Extended Top, Extended Bottom (EXT).
				6. Style: Extended Top, Flat Bottom (EXT/FB).
				7. Style: Spear Point Top, Extended Bottom (SP).
				8. Style: Spear Point Top, Flat Bottom (SP/FB).
				9. Style: Curve Top, Extended Bottom (CT).
				10. Style: Curve Top, Flat Bottom (CT/FB).

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai (V2) Commercial Fence Systems. Select either 2 or 3 rail panel design. The PL style is only available with 3 rails. Contact Specifications@FortressFence.com for additional rail options.

* + - * 1. Rails: 2.
				2. Rails: 3.
				3. Fence Panels: Fabricated in standard length of 90-1/2 inches (2299 mm).

\*\* NOTE TO SPECIFIER \*\* Delete heights not required.

Height: As indicated on the Drawings.

Height: 34 inch (864 mm).

Height: 40 inch (1016 mm).

Height: 46 inch (1168 mm).

Height: 54 inch (1372 mm).

Height: 58 inch (1473 mm).

Height: 70 inch (1778 mm).

Height: 82 inch (2083 mm).

Height: 94 inch (2388 mm).

* + - * 1. Airspace Between Pickets, Versai (V2) Assurance Commercial: 3 inch.
				2. Materials:

Rails shall be cold-rolled steel formed U-channel and pickets shall be cold-rolled steel formed and welded tubing, both having a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653 and have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653.

Posts shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653, have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653, and have a powder-coated factory finish.

* + - * 1. Components:

Rails: 1-9/16 inch (40 mm) by 1-3/16 inch (30 mm) (Leg x Web), 14 gauge.

Pickets:

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai Assurance (V2) Commercial Fence Systems. Delete this section is not specifying one of the following heights: 34", 40", 46", 54", 58", and 70".

3/4 inch (19 mm) square, 16 gauge.

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai Assurance (V2) Commercial Fence Systems. Delete this section is not specifying one of the following heights: 82" and 94".

3/4 inch (19 mm) square, 14 gauge.

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai Assurance (V2) Commercial Fence Systems. Delete posts not required.

* + - * 1. Posts: 2-1/2 inch (64 mm) square, 16 gauge.
				2. Posts: 2-1/2 inch (64 mm) square, 14 gauge.
				3. Posts: 2-1/2 inch (64 mm) square, 12 gauge.
				4. Posts: 3 inch (76 mm) square, 14 gauge.
				5. Posts: 3 inch (76 mm) square, 12 gauge.

\*\* NOTE TO SPECIFIER \*\* Delete if gates not required.

* + - * 1. Gates: Provide manufacturer's standard gates and hardware.
				2. Fabrication:

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai Assurance (V2) Commercial Fence Systems. Delete heights not selected above.

Fence panels shall be fabricated in standard length of 90-1/2 inches (2299 mm). Comply with requirements indicated for materials, thickness, design, and details of construction.

Pickets are welded to the rails with a patented pin hinge system which allows the panel to rake without metal fatigue or damage to the finish.

Welded connections shall comply with AWS standards for recommended practice in shop welding.

Components shall be accurately cut and drilled to receive hardware, fasteners, and accessories.

Panels shall be rackable to an 18 degree change in grade (30 inch vertical travel per panel).

Fence panel shall be capable of meeting structural test load capabilities for a commercial fence system referenced in table 2 of ASTM 2409.

Fence panel shall be capable of meeting coating performance requirements in table 3 of ASTM 2409.

\*\* NOTE TO SPECIFIER \*\* Versai Assurance Residential Fence Systems. Select fence panel style, delete all others. Delete section if not required.

* + - 1. Basis of Design: Versai Assurance Residential Fence Systems as manufactured by Fortress Fence Products, a division of The Fortress Company.
				1. Style: As indicated on the Drawings.
				2. Style: Flat Top, Extended Bottom (FT).
				3. Style: Flat Top, Flat Bottom (FT/FB).
				4. Style: Flat Top, Flat Bottom (PL) for Swimming Pool installations
				5. Style: Extended Top, Extended Bottom (EXT).
				6. Style: Extended Top, Flat Bottom (EXT/FB).
				7. Style: Spear Point Top, Extended Bottom (SP).
				8. Style: Spear Point Top, Flat Bottom (SP/FB)

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai Assurance Residential Fence Systems. Select either 2 or 3 rail panel design. The PL style is only available with 3 rails.

* + - * 1. Rails: 2.
				2. Rails: 3.
				3. Fence Panels: Fabricated in standard length of 90-1/2 inches (2299 mm).

\*\* NOTE TO SPECIFIER \*\* Delete heights not required.

Height: As indicated on the Drawings.

Height: 34 inch (864 mm).

Height: 40 inch (1016 mm).

Height: 46 inch (1168 mm).

Height: 48 inch (1219 mm).

Height: 54 inch (1372 mm).

Height: 58 inch (1473 mm).

Height: 70 inch (1778 mm).

* + - * 1. Airspace Between Pickets, Versai Assurance Residential: 3 inch.
				2. Materials:

Rails shall be cold-rolled steel formed U-channel and pickets shall be cold-rolled steel formed and welded tubing, both having a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653 and have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653.

Posts shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653, have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653, and have a powder-coated factory finish.

* + - * 1. Components:

Rails: 1-3/16 inch (30 mm) by 1 inch (25 mm) (Leg x Web), 16 gauge.

Pickets: 5/8 inch (16 mm) square, 18 gauge.

Posts: 2 inch (51 mm) square, 16 gauge.

\*\* NOTE TO SPECIFIER \*\* Delete if gates not required.

* + - * 1. Gates: Provide manufacturer's standard gates and hardware.
				2. Fabrication:

\*\* NOTE TO SPECIFIER \*\* Option below applies to Versai Assurance Residential Fence Systems. Delete heights not selected above.

Fence panels shall be fabricated in standard length of 90-1/2 inches (2299 mm). Comply with requirements indicated for materials, thickness, design, and details of construction.

Pickets are welded to the rails with a patented pin hinge system which allows the panel to rake without metal fatigue or damage to the finish.

Welded connections shall comply with AWS standards for recommended practice in shop welding.

Components shall be accurately cut and drilled to receive hardware, fasteners, and accessories.

Panels shall be rackable to a 30 degree change in grade (48 inch vertical travel per panel).

Fence panel shall be capable of meeting structural test load capabilities for a residential fence system referenced in table 2 of ASTM 2409.

Fence panel shall be capable of meeting coating performance requirements in table 3 of ASTM 2409.

\*\* NOTE TO SPECIFIER \*\* Finish section applies to Versai (V2) Commercial, Versai Residential, Versai Assurance (V2) Commercial and Versai Assurance Residential. Delete section if one of these fence systems is not required.

* + - 1. Finish:
				1. Materials are coated with the Fortress Shield process including galvanization, zinc phosphate, electrodeposition (E-coat), and architectural grade powder coat.
				2. Metal parts shall be assembled and finished individually prior to shipment.
				3. Galvanized steel fence components shall be cleaned with a non-petroleum solvent followed by the application of a sealing zinc phosphate coating.
				4. Immediately after sealing, provide a two-step finishing process consisting first of an electrostatic dipping process in a lead-free high corrosion resistant epoxy resin leaving a coating of approximately 20 microns followed by a thermosetting carboxyl polyester resin top coat with a minimum dry film thickness of 60 microns. The second coating shall be applied by the electrostatic spray process.

\*\* NOTE TO SPECIFIER \*\* Delete Versai (V3) Industrial Fence system is not required.

* + - 1. Basis of Design: Versai (V3) Industrial Fence Systems as manufactured by Fortress Fence Products, a division of The Fortress Company.
				1. Materials: Rails and Pickets to be Grade A cold rolled 45,000 psi steel conforming to ASTM A500. G-60 zinc coating, 0.60 oz per sq ft, total inside and outside surfaces in accordance with ASTM A123 hot dipped electroplating process.
				2. Components:

Rails (Leg x Web): 1-3/4 x 1-3/4 inch (44 x 44 mm), 12 gauge formed U-Channel ASTM 500 galvanized steel.

Pickets: 1 inch (25 mm) square 14 gauge ASTM A500 galvanized welded and roll-formed steel tubing.

Posts: ASTM A500 galvanized formed and welded steel tubing with powder coated factory finish.

\*\* NOTE TO SPECIFIER \*\* 2-1/2 inch (64 mm) square posts are for fence heights up to and including 6 ft (1829 mm). 3 inch (76 mm) square posts are for 7 and 8 ft (2134 and 2438 mm) fence heights. Delete size options not required.

Size: 2-1/2 inch (64 mm) square 12 gauge.

Size: 3 inch (76 mm) square 12 gauge

\*\* NOTE TO SPECIFIER \*\* Delete color options not required. Additional colors available upon request.

Color: Black Sand.

Color: Gloss Black.

Color: Bronze.

Color: Green Sand.

Color: Green.

Color: \_\_\_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Delete style options not required.

* + - * 1. Style: Flat Top; FT.
				2. Style: Flat Top Flat Bottom; FT/FB.
				3. Style: Pool; PL.
				4. Style: Extended Picket; EXT.
				5. Style: Extended Picket Flat Bottom; EXT/FB.
				6. Style: Pressed Spear; SP.
				7. Style: Pressed Spear Flat Bottom; SPFB.
				8. Style: Curved Top; CT.
				9. Fabrication:

Air Space Between Pickets: 3-7/8 inch (98 mm).

Fence panels: Fully assembled and fabricated. All panels comply with requirements indicated for materials, thickness, design and details of construction.

Rail Length: 90-1/2 inches (2324 mm).

\*\* NOTE TO SPECIFIER \*\* Delete picket heights options not required.

Picket Heights: 34 inches (864 mm).

Picket Heights: 40 inches (1016 mm).

Picket Heights: 46 inches (1168 mm).

Picket Heights: 58 inches (1473 mm).

Picket Heights: 70 inches (1778 mm).

Picket Heights: 82 inches (2083 mm).

Picket Heights: 94 inches (2388 mm).

Pickets: Welded to rails with a patented pin hinge system which allows panel to rake without metal fatigue or damage to the finish.

Welded Connections: Comply with AWS standards for recommended practice in shop welding.

Components are accurately cut and drilled to receive hardware, fasteners and accessories.

Panels: Capable of meeting the vertical load, horizontal load, and infill performance requirements for Industrial weight fence under ASTM F2408. Rackable to a 26 inch (660 mm) or 16.8-degree change in grade.

* + - * 1. Finish:

FortressShield Process: Coat materials including galvanization, nano ceramic coating, electrodeposition (E- coat), and architectural grade powder coat.

Metal Parts: Assembled and finished individually prior to shipment.

Galvanized Steel Fence Components: Cleaned with a non-petroleum solvent followed by application of a sealing nano ceramic coating.

Immediately After Sealing: A two-step finishing process.

An electrostatic dipping process in a lead free high corrosion resistant epoxy resin leaving a coating of approximately 20 microns.

A thermosetting carboxyl polyester resin top coat with a minimum dry film thickness of 60 to 70 microns. The second coating will be applied by the electrostatic spray process.

* + - * 1. Post Sizes:

\*\* NOTE TO SPECIFIER \*\* Delete post sizes and panel height options not required.

Fence Posts: 2.5 inch (64 mm) x 12 ga.

\*\* NOTE TO SPECIFIER \*\* Up to and Including 6 ft (1829 mm) height.

Panel Height: \_\_\_\_\_\_\_\_.

Panel Height: 6 ft (1829 mm ).

Fence Posts: 3 inch (76 mm) x 12 ga.

Panel Height: 7 ft (2134 mm) height.

Panel Height: 8 ft (2438 mm) height.

* + - * 1. Post Spacing by Bracket Type:

Spacing: 8 ft (2438 mm) nominal for 90.5 inch (2299 mm) rail for Flat top, spear top, extended picket and curved top.

\*\* NOTE TO SPECIFIER \*\* Delete bracket type post size options not required.

Bracket Type: One Direction Flat Mount (Ex-107).

Post Size: 2.5 inches (64 mm).

Post Settings On Center: 94.25 inches (2394 mm).

Post Size: 3 inches (76 mm).

Post Settings On Center: 94.75 inches (2407 mm).

Bracket Type: Two Direction Line (EX-207).

Post Size: 2.5 inches (64 mm).

Post Settings On Center: 94.25 inches (2394 mm).

Post Size: 3 inches (76 mm).

Post Settings On Center: 94.75 inches (2407 mm).

Bracket Type: Three Direction Universal (EX-307).

Post Size: 2.5 inches (64 mm).

Post Settings On Center: 94.25 inches (2394 mm).

Post Size: 3 inches (76 mm).

Post Settings On Center: 94.75 inches (2407 mm).

Bracket Type: Swivel Flat Mount (EXS-107).

Post Size: 2.5 inches (64 mm).

Post Settings On Center: 94.25 inches (2394 mm).

Post Size: 3 inches (76 mm).

Post Settings On Center: 94.75 inches (2407 mm).

* + - * 1. Gate Post Sizes:

\*\* NOTE TO SPECIFIER \*\* Delete gate height and gate leaf options not required.

Gate Height: Up to and Including 4 ft (1219 mm).

Gate Leaf: Up to 4 ft (1219 mm). Post Size: 2.5 inch (64 mm) x 12 ga.

Gate Leaf: 4 ft-1 inch (1245 mm) to 6 ft (1289 mm). Post Size: 3 inch (76 mm) x 12 ga.

Gate Leaf: 6 ft-1 inch (1854 mm) to 8 ft (2438 mm). Post Size: 3 inch (76 mm) x 12 ga.

Gate Height: Over 4 ft (1219 mm) Up to and Including 6 ft (1289 mm).

Gate Leaf: Up to 4 ft (1219 mm). Post Size: 3 inch (76 mm) x 12 ga.

Gate Leaf: 4 ft-1 inch (1219 mm) to 6 ft (1829 mm). Post Size: 3 inch (76 mm) x 12 ga.

Gate Leaf: 6 ft-1 inch (1854 mm) to 8 ft (2438 mm). Post Size: 4 inch (102 mm) x 11 ga.

Gate Height: 7 ft (7134 mm).

Gate Leaf: Up to 4 ft (1219 mm). Post Size: 3 inch (76 mm) x 12 ga.

Gate Leaf: 4 ft-1 inch (1245 mm) to 6 ft (1829 mm). Post Size: 4 inch (102 mm) x 11 ga.

Gate Leaf: 6 ft-1 inch (1854 mm) to 8 ft (2438 mm). Post Size: 6 inch (152 mm) x 3/16 inches (5 mm).

Gate Height: 8 ft (2438 mm).'

Gate Leaf: Up to 4 ft (1219 mm). Post Size: 3 inch (76 mm) x 12 ga.

Gate Leaf: 4 ft-1 inch (1245 mm) to 6 ft (1829 mm). Post Size: 4 inch (102 mm) x 11 ga.

Gate Leaf: 6 ft-1 inch (1854 mm) to 8 ft (2438 mm). Post Size: 6 inch (152 mm) x 3/16 inches (5 mm).

\*\* NOTE TO SPECIFIER \*\* The following tables are applicable to Titan Industrial only, and provide design guidance on post sizes and spacing. Delete if not required.

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| Minimum Post Sizes for Titan Industrial  |

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| --- | --- |
| Line of Fence Posts | Panel Heights |
| 2.5" x 12ga | Up to & Including 6' height |
| 3" x 12ga | 7' up to 10' |

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| --- |
| Titan Industrial Post Spacing by Bracket Type  |

|  |  |
| --- | --- |
| Style | Flat Top, Spear Top, Extended Picket and Curved Top 8' Nominal (90.5" Rail) |
| Bracket Types | One Direction Flat Mount (EX-107), for 2-1/2" post size, 95" +/- 1/4" OC post settings |
|  | One Direction Flat Mount (EX-107), for 3" post size, 95.5" +/- 1/4" OC post settings |
|  | Two Direction Line (EX-207), for 2-1/2" post size, 95" +/- 1/4" OC post settings |
|  | Two Direction Line (EX-207), for 3" post size, 95.5" +/- 1/4" OC post settings |
|  | Three Direction Universal (EX-307), for 2-1/2" post size, 95" +/- 1/4" OC post settings |
|  | Three Direction Universal (EX-307), for 3" post size, 95.5" +/- 1/4" OC post settings |
|  | Swivel Flat Mount (EXS-107), for 2-1/2" post size, 95" +/- 1/4" OC post settings |
|  | Swivel Flat Mount (EXS-107), for 3" post size, 95.5" +/- 1/4" OC post settings |

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| Titan Industrial Gate Posts Sizes |

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| --- | --- | --- | --- |
| Gate Leaf |  | Gate Height |  |
|  | Up to & Including 6' | Over 6' Up to & Including 8' | Over 8' up to and Including 10' |
| Up to 4' | 3" x 12ga | 3" x 12ga | 4" x 11ga |
| 4'1" to 6' | 3" x 12ga | 3" x 12ga | 4" x 11ga |
| 6'1" to 8' | 4" x 11ga | 6" x 3/16" wall | 6" x 3/16" wall |

* + 1. Ornamental Rackable Mechanically Locked Steel Fence Systems:

\*\* NOTE TO SPECIFIER \*\* Titan Industrial Fence Systems. Select fence panel style, delete all others. Delete section if not required.

* + - 1. Basis of Design: Titan Industrial Fence Systems as manufactured by Fortress Fence Products, a division of The Fortress Company.
				1. Style: As indicated on the Drawings.
				2. Style: Flat Top, Extended Bottom (FT).
				3. Style: Extended Top, Extended Bottom (EXT).
				4. Style: Spear Point Top, Extended Bottom (SP).
				5. Style: Curve Top, Extended Bottom (CT).

\*\* NOTE TO SPECIFIER \*\* Option below applies to Titan Industrial Fence Systems. Select either 2 or 3 rail panel design. Contact Specifications@FortressFence.com for additional rail options.

* + - * 1. Rails: 2.
				2. Rails: 3.

\*\* NOTE TO SPECIFIER \*\* Materials cannot be produced internationally.

* + - * 1. Fence Panels: Fabricated in standard length of 92 inches (2337 mm).

\*\* NOTE TO SPECIFIER \*\* Delete heights not required.

Height: As indicated on the Drawings.

Height: 34 inch (864 mm).

Height: 46 inch (1168 mm).

Height: 58 inch (1473 mm).

Height: 70 inch (1778 mm).

Height: 82 inch (2083 mm).

Height: 94 inch (2388 mm).

Height: 106 inch (2692 mm).

Height: 118 inch (2997 mm).

\*\* NOTE TO SPECIFIER \*\* Materials produced internationally.

* + - * 1. Fence Panels: Fabricated in standard length of 90-1/2 inches (2299 mm).

\*\* NOTE TO SPECIFIER \*\* Delete heights not required.

Height: As indicated on the Drawings.

Height: 34 inch (864 mm).

Height: 46 inch (1168 mm).

Height: 58 inch (1473 mm).

Height: 70 inch (1778 mm).

Height: 82 inch (2083 mm).

Height: 94 inch (2388 mm).

Height: 106 inch (2692 mm).

Height: 118 inch (2997 mm).

* + - * 1. Airspace Between Pickets: 3-15/16 inch.

\*\* NOTE TO SPECIFIER \*\* Option below applies to Titan Industrial Fence Systems produced internationally. Delete this section if materials cannot be produced internationally.

* + - * 1. Materials:

Rails shall be cold-rolled steel formed U-channel and pickets shall be cold-rolled steel formed and welded tubing, both having a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653 and have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653.

Posts shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653, have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653, and have a powder-coated factory finish.

\*\* NOTE TO SPECIFIER \*\* Option below applies to Titan Industrial Fence Systems produced domestically. Delete this section if materials to be produced internationally.

* + - * 1. Materials:

Rails shall be cold-rolled steel formed U-channel and pickets shall be cold-rolled steel formed and welded tubing, both having Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653 and have a G90 zinc coating, 0.90 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653.

Posts shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653, have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653, and have a powder-coated factory finish.

* + - * 1. Components:

Rails: 1-3/4 inch (44.5 mm) x 1-3/4 inch (44.5 mm), 14 gauge.

\*\* NOTE TO SPECIFIER \*\* Delete picket gauge not required.

Pickets: 1 inch (25 mm) square, 14 gauge.

Pickets: 1 inch (25 mm) square, 16 gauge.

Pickets: 1 inch (25 mm) square, 18 gauge.

Slide Lock: 18 gauge patented slide lock system, attaches pickets to each rail.

\*\* NOTE TO SPECIFIER \*\* Delete post size not required.

Post Size: 2-1/2 inches (63.5 mm) tube, 16 gauge.

Post Size: 2-1/2 inches (63.5 mm) tube, 14 gauge.

Post Size: 2-1/2 inches (63.5 mm) tube, 12 gauge.

Post Size: 3 inches (76 mm) tube, 12 gauge.

Post Size: 4 inches (102 mm) tube, 11 gauge.

\*\* NOTE TO SPECIFIER \*\* Delete if gates not required.

* + - * 1. Gates: Provide manufacturer's standard gates and hardware.
				2. Fabrication:

\*\* NOTE TO SPECIFIER \*\* Option below applies to Titan Industrial Fence. Materials cannot be produced internationally.

Fence panels shall be fabricated in standard length of 92 inches (2337 mm). Comply with requirements indicated for materials, thickness, design, and details of construction.

\*\* NOTE TO SPECIFIER \*\* Option below applies to Titan Industrial Fence. Materials to be produced internationally.

Fence panels shall be fabricated in standard length of 90-1/2 inches (2299 mm). Comply with requirements indicated for materials, thickness, design, and details of construction.

Pickets are inserted into the rails through grommets which are put into the rails pre-punched holes, and held in place with the patented slide lock system. This allows the panel to rake without metal fatigue or damage to the finish.

Panels shall be rackable to a 14.5 degree change in grade (24 inch vertical travel per panel).

Components shall be accurately cut and drilled to receive hardware, fasteners, and accessories.

Fence panel shall be capable of meeting structural test load capabilities for an industrial fence system referenced in table 2 of ASTM 2409.

Fence panel shall be capable of meeting coating performance requirements in table 3 of ASTM 2409.

* + - 1. Basis of Design: Titan Commercial Fence Systems as manufactured by Fortress Fence Products, a division of The Fortress Company.
				1. Style: As indicated on the Drawings.
				2. Style: Flat Top, Extended Bottom (FT).
				3. Style: Extended Top, Extended Bottom (EXT).
				4. Style: Spear Point Top, Extended Bottom (SP).

\*\* NOTE TO SPECIFIER \*\* Option below applies to Titan Commercial Fence Systems. Select either 2 or 3 rail panel design. Contact Specifications@FortressFence.com for additional rail options.

* + - * 1. Rails: 2.
				2. Rails: 3.

\*\* NOTE TO SPECIFIER \*\* Materials cannot be produced internationally.

* + - * 1. Fence Panels: Fabricated in standard length of 92 inches (2337 mm).

\*\* NOTE TO SPECIFIER \*\* Delete heights not required.

Height: As indicated on the Drawings.

Height: 34 inch (864 mm).

Height: 46 inch (1168 mm).

Height: 58 inch (1473 mm).

Height: 70 inch (1778 mm).

\*\* NOTE TO SPECIFIER \*\* Materials produced internationally.

* + - * 1. Fence Panels: Fabricated in standard length of 90-1/2 inches (2299 mm).

\*\* NOTE TO SPECIFIER \*\* Delete heights not required.

Height: As indicated on the Drawings.

Height: 34 inch (864 mm).

Height: 46 inch (1168 mm).

Height: 58 inch (1473 mm).

Height: 70 inch (1778 mm).

* + - * 1. Airspace Between Pickets: 3-15/16 inch.

\*\* NOTE TO SPECIFIER \*\* Option below applies to Titan Commercial Fence Systems produced internationally. Delete this section if materials cannot be produced internationally.

* + - * 1. Materials:

Rails shall be cold-rolled steel formed U-channel and pickets shall be cold-rolled steel formed and welded tubing, both having a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653 and have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653.

Posts shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653, have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653, and have a powder-coated factory finish.

\*\* NOTE TO SPECIFIER \*\* Option below applies to Titan Commercial Fence Systems produced domestically. Delete this section if materials to be produced internationally.

* + - * 1. Materials:

Rails shall be cold-rolled steel formed U-channel and pickets shall be cold-rolled steel formed and welded tubing, both having Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653 and have a G90 zinc coating, 0.90 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653.

Posts shall be cold-rolled steel formed and welded tubing with a Grade A minimum tensile strength of 45,000 psi (310 MPa) conforming to ASTM A653, have a G60 zinc coating, 0.60 oz./ft2 (0.18 kg/m2) in accordance with ASTM A653, and have a powder-coated factory finish.

* + - * 1. Components:

Rails: 1-3/4 inch (44 mm) by 1-1/2 inch (38 mm) (Leg x Web), 16 gauge.

Pickets: 3/4 inch (19 mm) square, 16 gauge.

Slide Lock: 18 gauge patented slide lock system, attaches pickets to each rail.

\*\* NOTE TO SPECIFIER \*\* Delete post size not required.

* + - * 1. Post Size: 2-1/2 inch (64 mm) square, 16 gauge.
				2. Post Size: 2-1/2 inch (64 mm) square, 14 gauge.
				3. Post Size: 2-1/2 inch (64 mm) square, 12 gauge.
				4. Post Size: 3 inch (76 mm) square, 12 gauge.
				5. Post Size: 4 inch (102 mm) square, 11 gauge.

\*\* NOTE TO SPECIFIER \*\* Delete if gates not required.

* + - * 1. Gates: Provide manufacturer's standard gates and hardware.
				2. Fabrication:

\*\* NOTE TO SPECIFIER \*\* Option below applies to Titan Industrial Fence. Materials cannot be produced internationally.

Fence panels shall be fabricated in standard length of 92 inches (2337 mm). Comply with requirements indicated for materials, thickness, design, and details of construction.

\*\* NOTE TO SPECIFIER \*\* Option below applies to Titan Industrial Fence. Materials to be produced internationally.

Fence panels shall be fabricated in standard length of 90-1/2 inches (2299 mm). Comply with requirements indicated for materials, thickness, design, and details of construction.

Pickets are inserted into the rails through grommets which are put into the rails pre-punched holes, and held in place with the patented slide lock system. This allows the panel to rake without metal fatigue or damage to the finish.

Panels shall be rackable to a 14.5 degree change in grade (24 inch vertical travel per panel).

Components shall be accurately cut and drilled to receive hardware, fasteners, and accessories.

Fence panel shall be capable of meeting structural test load capabilities for a commercial fence system referenced in table 2 of ASTM 2409.

Fence panel shall be capable of meeting coating performance requirements in table 3 of ASTM 2409.

* + - 1. Finish:

\*\* NOTE TO SPECIFIER \*\* Finish section applies to Titan Commercial and Titan Industrial panels produced internationally. Delete this section if panels cannot be fabricated internationally.

* + - * 1. Materials are coated with the Fortress Shield process including galvanization, zinc phosphate, electrodeposition (E-coat), and architectural grade powder coat.
				2. Metal parts are assembled and finished individually prior to shipment.
				3. Galvanized steel fence components are cleaned with a non-petroleum solvent followed by the application of a sealing zinc phosphate coating.
				4. Immediately after sealing, a two-step finishing process consisting first of an electrostatic dipping process in a lead free high corrosion resistant epoxy resin leaving a coating of approximately 20 microns followed by a thermosetting carboxyl polyester resin top coat with a minimum dry film thickness of 50 microns. The second coating will be applied by the electrostatic spray process.

\*\* NOTE TO SPECIFIER \*\* Finish section applies to Titan Commercial and Titan Industrial panels produced domestically. Delete this section if panels are to be produced internationally.

* + - * 1. Materials are coated with the Fortress Armour process including galvanization, zinc phosphate, epoxy powder coat, and architectural grade powder coat.
				2. Metal parts are finished and assembled individually prior to shipment.
				3. Galvanized steel fence components are cleaned with a non-petroleum solvent followed by the application of a sealing zinc phosphate coating.
				4. Immediately after sealing, a two-step finishing process consisting first of an epoxy powder coat leaving a coating of approximately 20 microns followed by a thermosetting carboxyl polyester resin top coat with a minimum dry film thickness of 60 microns. The second coating will be applied by the electrostatic spray process.
		1. Ornamental Rackable Aluminum Fence Systems:
			1. Basis of Design: A2 Commercial Aluminum Fencing System as manufactured by Fortress Fence Products, a division of The Fortress Company. Hidden picket to rail fastener system offering high quality aesthetics. Notched Rail andf Pre- Punched Post design.
			2. Standards Compliance: ASTM F2957 for commercial applications. Meets or exceeds.
			3. Available Racking: 28 inch (710 mm), vertical.
			4. Rails: 1-1/2 inches (38 mm).
			5. Pickets: 3/4 inches (19 mm).
			6. Gate Uprights: 2 inches (51 mm).
			7. Air Spaces: 3-3/4 inches (95 mm).
			8. Panel Styles:

\*\* NOTE TO SPECIFIER \*\* Delete configuration and style options not required.

* + - * 1. Configuration: As indicated on Drawings.
				2. Configuration: 2 rail.
				3. Configuration: 3 rail.
				4. Configuration: 4 rail.
				5. Style: As indicated on the Drawings.
				6. Style: Flat Top, Extended Bottom (FT).
				7. Style: Flat Top, Flat Bottom (FT/FB).
				8. Style: Pressed-Spear, Extended Bottom (PS).
				9. Style: Pressed-Spear, Flat Bottom (PS/FB).
			1. Panel Dimensions:

\*\* NOTE TO SPECIFIER \*\* Delete width and height options not required.

* + - * 1. Width: As indicated on the Drawings.
				2. Width: 72 inches (1829 mm).
				3. Width: 96 inches (2438 mm).
				4. Height: 48 inches (1219 mm).
				5. Height: 54 inches (1372 mm).
				6. Height: 60 inches (1524 mm).
				7. Height: 72 inches (1829 mm).

\*\* NOTE TO SPECIFIER \*\* Delete gate styles not required.

* + - 1. Gate Styles: As indicated on the Drawings.
			2. Gate Styles: Walk Gates, Flat/ 48 inches (1219 mm).
			3. Gate Styles: Walk Gates, Arched: 48 inches (1219 mm).
			4. Gate Styles: Walk Gates, Flat: 60 inches (1524 mm).
			5. Gate Styles: Walk Gates, Arched: 60 inches (1524 mm).
			6. Gate Styles: Welded Drive Gate, Flat: 72 inches (1829 mm).
			7. Gate Styles: Welded Drive Gate, Arched: 72 inches (1829 mm).
			8. Posts and Accessories:

\*\* NOTE TO SPECIFIER \*\* Delete items not required.

* + - * 1. Posts, End, Line, Corner, Gate: 2-1/2 inch square
				2. Posts, End, Line, Corner, Gate: 3 inch square
				3. Cap: Pressed dome.
				4. Cap: Nylon Gate upright.
				5. Wall mount bracket.
				6. Post base and adapter cover.
				7. Swivel bracket.
				8. Gate latch and Hinge kit
			1. Finish: Powder coating. Architectural grade.

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - * 1. Color: As indicated on the Drawings.
				2. Color: \_\_\_\_\_\_\_\_.
				3. Color: Black Sand
				4. Color: Gloss Black
				5. Color: Bronze
				6. Color: White
			1. Fastening Connections:
				1. Rail to Post: Slip fit into routings and then secured to the post with one No. 12-14 (0.162 inch minor diameter) by 2-1/2 inch (64 mm) long, hex-washer head, galvanized steel, self-drilling screw
				2. Picket to Picket Retainer: One blind pop rivet to each retainer.
				3. Picket Retainers to Rail: Snap fit into rail - no mechanical connections.
1. EXECUTION
	1. EXAMINATION
		1. Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Architect, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
	2. PREPARATION
		1. Stake layout showing locations of gates and posts per submitted shop drawings.
			1. Contact "CALL BEFORE YOU DIG" prior to beginning any excavation work
		2. Contact applicable authorities and take necessary precautions prior to beginning any excavation work.
	3. INSTALLATION
		1. Install fences in accordance with manufacturer's written instructions and in accordance with authorities having jurisdiction. Installation shall conform to the specifications referenced elsewhere in this Section and as indicated on the Drawings.
		2. Concrete Set Posts: Drill hole in firm soil. Posts holes will be a minimum of 36 inches ( mm) deep (environmental conditions or local codes may require a greater depth). Fence post shall be spaced 95 inches ( mm) plus or minus 1/4 inch ( 6 mm) on-center to accommodate installation of brackets on 2-1/2 inch (64 mm) square post. For non-level installations, the on-center post spacing must be measured along the grade.
		3. Refer to Division 3 for concrete specification. Recommend minimum 28 day compressive strength of 3,000 psi (20 MPa). Crown concrete at top to shed water.
		4. On-center post spacing per manufacturer's drawings.

\*\* NOTE TO SPECIFIER \*\* Delete section if specifying a welded panel: Classic Residential; Classic Commercial; or Estate.

* + 1. For non-level installations the on-center post spacing must be measured along the grade. Ensure that fence sections are parallel to grade within 1/4 inch (6 mm) in 12 feet (3658 mm).
		2. Install brackets onto fence section and posts as indicated in manufacturer's printed instructions for specific fence style. Attach fence sections to brackets with approved fasteners and techniques to ensure that fence sections are parallel to grade within 1/4" in 12 feet.
		3. Install gate in accordance with manufacturer's printed instructions and approved signoff drawings. Do not mount gate from wall of a structure. Provide gate post on both sides of a gate. For double drive gate installation, provide concrete center drop to foundation depth and drop rod retainers at center. Lubricate to ensure smooth operation and verify proper latch operation.
	1. CLEANING
		1. Remove cutting and drilling chips that are attached to the fencing, post, brackets, or additions to prevent corrosion.
		2. Repair scratches and other installation-incurred damage. Using a spray paint of the appropriate color that includes a zinc additive, repaint and seal any scratches or holes drilled in the fencing, post, brackets, or additions to prevent rust from forming. Clean up debris and unused material and remove from site.
		3. Clean up debris and unused material, and remove from site.
	2. PROTECTION
		1. Protect finishes from damage during construction period with temporary protective coverings approved by manufacturer. Remove protective coverings at time of Substantial Completion.
		2. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION