

## **SECTION 02820 FENCES AND GATES**

### **PART 1 - GENERAL**

#### **1.01 SUMMARY**

- A. Section Includes: Kroy vinyl fencing and gate systems.
- B. Related Sections: Section(s) related to this section include:
  - 1. Division 3 Section: Concrete
  - 2. Division 2 Section: Site Construction
    - a. 02300- Earthwork
  - 3. Division 6 Section: Woods and Plastics
    - a. 06510- Structural Plastic Shapes and Plates
    - b. 06520- Plastic Structural Assemblies
    - c. 06600- Plastic Fabrications

#### **1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM D256 Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
  - 2. ASTM D638 Standard Test Method for Tensile Properties of Plastics.
  - 3. ASTM D648 Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
  - 4. ASTM D792 Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
  - 5. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
  - 6. ASTM D4216 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) and Related PVC and Chlorinated Poly (Vinyl Chloride) (CPVC) Building Products Compounds.
  - 7. ASTM F964 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Exterior Profiles Used for Fencing.

#### **1.03 DEFINITIONS**

- A. Posts: Vertical structure support members of the fence/gate system.
- B. Rails: Horizontal structural support members of the fence/gate system.
- C. Pickets: Vertical members between the bottom and top rails.
- D. Aluminum Channel: Structural supports inside rails.
- E. Galvanized Steel Channel: Structural supports inside rails.

#### **1.04 SYSTEM DESCRIPTION**

- A. The contractor shall provide a complete PVC fencing/gate system of the design, style and strength defined herein. Fencing and gate components are comprised of

profiles made of extruded, rigid polyvinylchloride (PVC). This PVC material is specially formulated for outdoor use with superior color hold and impact resistant properties after extended outdoor exposure. The system shall include all posts, rails, pickets, caps, metal inserts, and accessory items necessary to complete the installation. Color shall be (specify white (standard), tan (Laguna Dune), khaki, or cottage gray.

#### 1.05 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract.
- B. Product Data: Submit product data for specified products.
- C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories and finish colors. Include details showing fabrication and installation of rails and pickets, including plans, elevations, sections, details of components and attachments to other units of work, if required.
- D. Samples: Submit selection and verification samples for finishes, colors, and profiles if requested.
- E. Quality Assurance Submittals: Submit the following:
  - 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties. Include copies of selected test reports by independent laboratories verifying the compliance of fencing components and systems with applicable building codes upon request.
  - 2. Compliance Reports: Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction. Provide evidence that the polyvinyl chloride fencing systems are in compliance with applicable building code in effect for project.
  - 3. Certificates: Product certificates signed by the manufacturer certifying that materials comply with specified performance characteristics and criteria and physical requirements.
  - 4. Manufacturer's Instructions: Manufacturer's installation instructions.
  - 5. Manufacturer's Field Reports: Manufacturer's field reports specified herein.
- F. Closeout Submittals: Submit the following:
  - 1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals

(Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.

2. Warranty: Warranty documents specified herein.

#### 1.06 QUALITY ASSURANCE

##### A. Qualifications:

1. Polyvinyl Chloride Fencing Fabricator/Installer Qualifications: Engage a Kroy Building Products licensed fabricator to ensure successful completion of project.
2. Obtain PVC fence accessories, fittings and fasteners from a Kroy Building Products approved source to ensure consistent quality standards are maintained throughout the project.
  - a. Certificate: When requested, submit certificate indicating qualifications.
3. Manufacturer Qualifications: Manufacturer should be capable of providing field service representation during construction and should be capable of approving acceptable installer and application methods.

#### 1.07 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 Product Requirements Sections.
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store materials protected from exposure to material handling damage and accumulation of dirt and grime, at temperature and humidity conditions recommended by manufacturer. Handle and store product according to Kroy recommendations. Store in original packaging whenever possible until components are required on the project.

#### 1.08 PROJECT CONDITIONS

- A. Field Measurements: Verify actual measurements and openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

## 1.09 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions used with their permission. The manufacturer is responsible for technical accuracy.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

## **PART 2 - PRODUCTS**

### 2.01 PVC FENCING and GATE SYSTEMS

- A. Manufacturer: Kroy Building Products, Inc.

- 1. Contact: 2719 Division Avenue, P.O. Box 636, York, NE 68467-0636;  
Telephone: (888) 289-5769, (402) 362-1212; Fax: (800) 933-5769.
- 2. Contact: 15159 Andrew Jackson Highway 76 W, Fair Bluff, NC 28439  
Telephone: (887) 543-5769, (910) 649-7501; Fax: (910) 649-7371

Specifier Note: Kroy vinyl products are manufactured from 100% new vinyl. The base ingredient is rigid PVC (polyvinyl chloride) homopolymer compound with a high level of titanium dioxide pigment for long-term UV resistance and impact modifiers for strength. The formulation is similar to that of vinyl siding and windows, which have more than 20 years of proven long-term durability and structural integrity. Product information is available for over 100 styles of fencing. For technical assistance, contact Kroy Building Products, Inc.

- B. Proprietary Product(s)/System(s): Kroy PVC Fencing Systems.

- 1. Post Profile Types and Sizes: As indicated on drawings and as follows:
  - a. 3 1/2" x 3 1/2" x 0.13 (89 x 89 x 3.3 mm) wall.
  - b. 4" x 4" x 0.135" (102 x 102 x 3.4 mm) wall.
  - c. 4" x 4" x 0.17" (102 x 102 x 4.3 mm) wall.
  - d. 5" x 5" x 0.13" (127 x 127 x 3.3 mm) wall
  - e. 5" x 5" x 0.15" (127 x 127 x 3.8 mm) wall.
  - f. 5" x 5" x 0.20" (127 x 127 x 5.1 mm) wall.
  - g. 6 1/2" x 6 1/2" x 0.17" (165 x 165 x 4.3 mm) wall.
- 2. Rails Profile Types and Sizes: As indicated on drawings and as follows:
  - a. 1 3/4" x 3 1/2" (44 x 89 mm).
  - b. 2" x 3 1/2" (51 x 89 mm) ribbed and open.
  - c. 3" x 3" (76 x 76 mm).

- d. 3 1/2" x 3 1/2" (89 x 89 mm).
  - e. 1 1/2" x 5 1/2" (38 x 140 mm) ribbed or open.
  - f. 1" x 6" (25 x 152 mm).
  - g. 2" x 6" (51 x 152 mm) ribbed or open
  - h. 2" x 6 1/2" (51 x 256) slotted.
  - i. 1" x 8" (25 x 203 mm) ribbed.
  - j. 2" x 8" (51 x 203 mm) ribbed or open.
3. Pickets Profile Types and Sizes: As indicated on drawings and as follows:
- a. 1 1/2" (38 mm) octagon.
  - b. 1 7/8" (48 mm) octagon.
  - c. 1" x 1" (25.4 x 25.4 mm) square.
  - d. 1 3/8" x 1 3/8" (35 x 35 mm) square.
  - e. 1 3/4" x 1 3/4" (44 x 44 mm) square.
  - f. 1 1/4" x 1 1/2" (32 x 38 mm) rectangular.
  - g. 3/4" x 1 1/2" (19 x 38 mm) rectangular.
  - h. 1" x 2" (25.4 x 51 mm) rectangular.
  - i. 7/8" x 3" (22.2 x 76 mm) rectangular.
  - j. 1" x 4" (25 x 102 mm) rectangular.
  - k. 1" x 6" (25 x 152 mm) rectangular.
  - l. 1" x 6" (25 x 152 mm tongue & groove.
  - m. 1" x 8" (25 x 203 mm) ribbed.
  - n. 1" x 8" (25 x 203 mm) tongue & groove.
  - o. 3/4" x 1 1/2" Dovetail Ribbed (tongue & groove).
4. Caps Profile Types and Sizes: As indicated on drawings and as follows:

Specifier Note: Edit and revise Paragraphs below to suit project requirements and specifier's practice.

- a. Post Cap Styles and Sizes:
  - 1) Ball: [4" x 4" (102 x 102 mm)] [5" x 5" (127 x 127 mm)] [3 1/2" x 3 1/2" x 0.13 (89 x 89 mm)].
  - 2) Classic Manor: [4" x 4" (102 x 102 mm)] [5" x 5" (127 x 127 mm)] [6 1/2" x 6 1/2" (165 x 165 mm)].
  - 3) Gothic: [4" x 4" (102 x 102 mm)] [5" x 5" (127 x 127 mm)].
  - 4) Pyramid: [4" x 4" (102 x 102 mm)] [5" x 5" (127 x 127 mm)].
  - 5) Flat: [5" x 5" (127 x 127 mm)].
- b. Rail Cap Styles and Sizes:
  - 1) Flat: [1" x 6" (25 x 152 mm)] [2" x 3 1/2" (51 x 89 mm) open] [1 1/2" x 5 1/2" (38 x 140 mm) ribbed or open] [1" x 8" (25 x 203 mm) ribbed] [2" x 6" (51 x 152 mm) open] [2" x 8" (51 x 203 mm) ribbed].
  - 2) Decorative Cap: [1" x 3 1/2"]

- c. Picket Cap Styles and Sizes:
  - 1) Flat: [1" x 4" (25 x 102 mm) rectangular] [1" x 6" (25 x 152 mm) rectangular].
  - 2) Square (Pyramid): [1 3/8" x 1 3/8" (35 x 35 mm) square] [1 3/4" x 1 3/4" (44 x 44 mm) square] .
  - 3) Arrowhead: [1" x 1" (25.4 x 25.4 mm) square].
  - 4) Ball Spear: [1" x 1" (25.4 x 25.4 mm) square].
  - 5) Dog Ear: [7/8" x 3" (22.2 x 76 mm) rectangular] [1" x 6" (25 x 152 mm) rectangular].
  - 6) Spade: [3/4" x 1 1/2" (19 x 38 mm) rectangular] [ 7/8" x 3" (22.2 x 76 mm) rectangular]
  - 7) Baby Gothic: [1" x 1" (25.4 x 25.4 mm) square].
  - 8) Octagon: [1 1/2" (38 mm) octagon]

Specifier Note: Edit Paragraph below. Kroy PVC Angular Railing Systems offer its 5" x 5" (127 x 127 mm) post towers in various lengths. Revise Paragraph below to suit project requirements and specifier's practice.

- 5. Lattice (white only)
  - a. 2 3/4" Classic Diamond
  - b. 2" Weave
- 6. Aluminum Reinforcements Types and Sizes: As indicated on drawings and as follows:
  - a. 3" (76 mm) flat ribbed insert for 1" x 3" (25.4 x 76 mm) cap rail.
  - b. P-channel for 2" x 3" (51 x 76 mm) open rail.
  - c. H-channel for 3" x 3" (76 x 76 mm) open rail.
  - d. 1.23" x 1.8" 20 gauge galvanized steel insert for 1 1/2" x 5 1/2" rail.
  - e. 2 1/2" " H channel
  - f. H channel for 4" x 4" (102 x 102 mm)
  - g. H channel for 5" x 5" (127 x 127 mm)
- 7. Finishes: Smooth, soft gloss.
- 8. Colors: Titanium dioxide is the main ultraviolet light inhibitor in the PVC material used to manufacture these products. Since it is a white pigment, dark colors are not practical or possible. Decorative cap rails are available with a selection of architectural accent colors in high performance acrylics. Three Timberlast™ colors are available for the 1" x 8" tongue and groove pickets which include Cedar Crest, Greystone, and Stained Cedar.

Specifier Note: Like Mother Nature, the grain patterns in the "Timberlast™" line are unique from panel to panel. This line is designed with streaks of color to emulate the look of stained cedar without the maintenance of wood. The Timberlast™ patterns are used exclusively for privacy fence inserts, and are designed to be used as either a beautiful compliment, or an attractive contrast to Kroy's solid color posts and trim.

- a. Rails: White, tan, gray, or khaki (khaki available in 2" x 3 1/2" and 2" x 6 1/2" rails only),
- b. Posts: White, tan, gray, or khaki (khaki available in 4"x4"x0.170" and 5"x5"x0.150" posts only)
- c. Pickets: White, tan, gray, or khaki (khaki available in 1 3/8" x 1 3/8" pickets only) Cedar Crest (1" x 8" tongue & groove only), Greystone (1" x 8" T&G only), Stained Cedar (1" x 8" T&G only).
- d. Decorative cap rails: green, blue, cranberry, grey, white, and tan.
- e. Post and Rail caps: contact Kroy dealer for color availability.

9. French Gate Components: As indicated on drawings and as follows:

Specifier Note: Contact Kroy for other hardware options that are available.

- a. Latch Assembly: [1 1/2" x 3 1/2"] [1 1/2" x 2 3/4"]
- b. Hinge Assembly [1 1/2" x 3 1/2"] [1 1/2" x 2 3/4"]
- c. Pop rivets.
- d. Pocket assembly (for attaching horizontal structural members to vertical structural members) [1 1/2" x 5 1/2"] [2" x 6"] [2" x 3 1/2"]

10. Product(s)/System(s) Testing: Provide PVC fencing system that complies with the following physical/chemical properties:

- a. ASTM D256 - Izod Impact greater than 5 ft lb/in (2.1 N•m/m) at 23 degrees C.
- b. ASTM D638 - Tensile Strength 6290 psi (43 MPa).
- c. ASTM D638 - Tensile Modulus 430,000 psi (2963 MPa).
- d. ASTM D648 - Deflection Temperature 67 degrees C.

## 2.02 PRODUCT SUBSTITUTIONS

A. Substitutions: No substitutions permitted.

Specifier Note: Edit Article below. Select types and sizes set forth in Article 2.01. Stainless steel or galvanized fasteners should be of sufficient size and strength to support local code requirements.

## 2.03 MATERIALS

A. Kroy PVC Fence System Materials:

- 1. General: Posts, rails, pickets, post caps, and picket caps shall comply with ASTM D4216, Class 143354311122.
- 2. Posts: One piece extruded square profile: [Specify type and size].

3. Rails: One piece extruded angular profile: [Specify type and size].
4. Picket/panels: One piece extruded profile: [Specify type or size].
5. Post Caps Molded: Specify to fit the selected post profile.
  - a. Sizes: [Specify Post Size]
  - b. Styles: [Ball] [Classic Manor] [Gothic] [Pyramid].
6. Rail Caps Molded: Specify to fit the selected post profile.
  - a. Sizes: [Specify Rail Size]
  - b. Styles: [Flat]
7. Picket Caps Molded: Specify to fit the selected post profile.
  - a. Sizes: [Specify Picket Size]
  - b. Styles: [Flat] [Square] [Arrowhead] [Ball Spear] [Dog Ear] [Spade] [Baby Gothic] [Octagon]
8. Gate Components: [Specify type or size].
9. Aluminum/Galvanized Steel Reinforcement Insert: [Specify type or size].
10. Miscellaneous Component: [Specify type or size].
11. Fasteners: [Specify].

Specifier Note: Edit Paragraph below. Retain or delete to meet project requirements and specifier's practices.

#### 2.05 RELATED MATERIALS

A. Related Materials: Refer to other sections listed in Related Sections Paragraph herein for related materials.

B. Adhesive and Cement:

1. Adhesive: PVC based adhesive with the same UV properties as Kroy fencing system.
  - a. Christy's
2. Products: Subject to compliance with requirements, provide 1 of the following:
  - a. "Quik-Crete"

#### 2.06 FABRICATION



- A. General: Fabricate fencing systems to comply with requirements indicated for design, dimensions, details, finish and member sizes, including wall thickness, but not less than those required to support structural loads.
  - 1. Fabricated at a Kroy licensed dealer and, if practical, pre-assemble fence sections prior to transporting to jobsite or have delivered in the skid-load knock down kits. Fabrication includes, but is not limited to, cutting, routing and drilling components in accordance with engineering drawings, specifications or Kroy CAD details for fence sections.
  - 2. Fabricate with galvanized steel or aluminum inserts as necessary.

## 2.07 SOURCE QUALITY

- A. Source Quality: Obtain PVC fencing system products from a single Kroy Building licensed dealer or approved source.

## PART 3 EXECUTION

### 3.01 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, product carton instructions for installation, or design/detail drawings.

### 3.02 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with that manufacturer's instructions.

### 3.03 PREPARATION

- A. All new installation shall be laid out by the contractor in accordance with the consultation plans.

### 3.04 INSTALLATION

- A. Depending upon the style of fence being installed, set fence posts on 6' or 8' centers (see individual installation instructions for the appropriate style). Set gate posts for gate opening specified in the construction drawings. Posts shall be placed 24" - 36" in the ground, depending upon the style of fence and local conditions and set in concrete (see individual installation instructions for the appropriate style).

- B. Gate posts and corner posts on all fences and line posts on taller fences shall be reinforced with cement and two No. 4 rebar members. Concrete should not contact rails to allow for expansion.
- C. Place assembled fence sections into position and slide rails into posts. The rails are secured into posts by tabs which are notched into the rails and catch on the inside wall of the post. Top rails may be further secured with a #8-3/4" screw through the rail, inside the post.
- D. Install gates using bolt-on hardware supplied by the manufacturer.
- E. Site Tolerances: [Specify applicable site tolerances for specified product(s) installation.].
- F. Related Products Installation: Refer to other sections listed in Related Sections Paragraph herein for related materials installation.

### 3.05 FIELD QUALITY REQUIREMENTS

- A. Site Tests [Installation and Post-Installation Testing]: [Specify applicable test requirements to be performed during and/or after product installation.].
- B. Inspection: [Specify applicable product inspection requirements to be performed after product installation.].

Specifier Note: Edit Paragraph below. Establish number and duration of periodic site visits with Owner and manufacturer, and specify below. Consult with manufacturer for services required. Coordinate Paragraph below with Division 1 Quality Assurance Section and Part 1 Quality Assurance Submittals herein. Delete if manufacturer's field service is not required.

- C. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
  - 1. Site Visits: [Specify number and duration of periodic site visits.].

### 3.07 CLEANING

Specifier Note: Kroy PVC fencing, deck and rail materials offer very low maintenance. They never need painting and are not subject to deterioration. These assemblies will get dirty just as any other product exposed to atmospheric conditions. An occasional pressure washing or cleaning with a long-handled soft-bristle brush of the type used to wash cars may be all that is necessary. If dirt is hard to remove, wipe down the PVC with a solution of 1 cup Simple Green to 1 gallon of water. Tide, Spic 'n Span or other household detergent may also be used. For stubborn stains, consult the manufacturer's literature.

- A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace products that have been installed and are damaged. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

END OF SECTION