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DIVISION: 06—WOOD AND PLASTIC
Section: 06610—Plastic Railings and Guards

REPORT HOLDER:

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EVALUATION SUBJECT:

**VEKA VINYL GUARDRAIL SYSTEMS: WHITMAN SYSTEM,
MAJESTIC SYSTEM AND CONRAD SYSTEM**

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)

Properties evaluated:

- Structural
- Durability
- Surface-burning characteristics

2.0 USES

The VEKA Vinyl Guardrail Systems described in this report are limited to exterior use as guards for balconies, porches, and decks. The products described in this report are used in exterior applications in (1) one- and two-family dwellings, (2) Group R Occupancy (residential), or (3) any occupancy group in buildings of Type V-B (IBC) construction and other types of construction in applications where untreated wood is permitted by Section 1406.3 (IBC) or buildings constructed in accordance with the IRC.

3.0 DESCRIPTION

3.1 General:

The VEKA Vinyl Guardrail System consists of 100 percent PVC railing components and aluminum reinforcement members for the top and bottom hollow rails. The PVC railing components are manufactured by an extrusion process in accordance with the approved quality control manual.

3.2 Guards:

3.2.1 General: The VEKA Vinyl Guardrail System is a guard consisting of post sleeves and caps and top and bottom rails, with aluminum inserts, balusters, and a bottom-rail support

block. The VEKA Vinyl Guardrail System components are 100 percent PVC except for the aluminum insert, which is made from aluminum alloy 6063-T5. The minimum yield and tensile strengths, and minimum thickness, of the aluminum inserts are specified in the approved quality control manual.

3.2.2 VEKA Vinyl Guardrail System: The height of the railing assembly is 36 inches or 42 inches (914 or 1067 mm) above the walking surface. Each post is covered with a 4-inch-by-4-inch PVC sleeve. The top rail has either a T-shape, an ornamental shape or a rectangular shape. The T-shaped rail is 3½ inches (88.9 mm) wide at the top and 2 inches (50.8 mm) wide at the bottom, and has a total depth of 3½ inches (88.9 mm) and a wall thickness of 0.11 inch (2.79 mm). The ornamental rail is 3 inches (76 mm) wide at the top and bottom with a 2.28-inch (57 mm) midsection and a crown top, and has a total depth of 3 inches (76 mm) and a wall thickness of 0.13 inch (3.3 mm). The rectangular top and bottom rail is 2 inches (50.8 mm) wide at top and bottom, and has a depth of 3½ inches (88.9 mm) and a wall thickness of 0.12 inch (3.05 mm). Both top and bottom rails are available in 6-foot, 8-foot and 10-foot (1.83, 2.44 and 3.05 m) lengths. The rail configuration using the T-shaped top rail and the rectangular bottom rail is called "Conrad." The rail configuration using the ornamental-shaped top rail and the rectangular bottom rail is called "Majestic." The rail configuration using the rectangular rail as both top and bottom rails is called "Whitman."

The balusters are hollow, blow-molded spindles as well as square and rectangular extruded hollow pickets. The spindles are 1½ inches (31.75 mm) square at the top and bottom. The pickets are 1 inch, 1¼ inches and 1½ inches (25.4, 31.75 and 38.1 mm) (regular wall and thin wall) square, and also come in rectangular shapes that are ½ inch by 7/8 inch (38.1 by 22.2 mm). When the pickets are installed in the rails, there is a clear space of approximately 3¾ inches (95.25 mm) between pickets.

The post sleeves are 4 inches (102 mm) square and have a wall thickness of either 0.16 inch (4.06 mm) or 0.135 inch (3.43 mm). (The latter is referred to as a thin wall.) See Figure 1 for dimensioned profiles of the post sleeves, top and bottom rails, top and/or bottom rail aluminum inserts, and balusters. The mounting brackets are made from molded plastic (LMT and AWM) or die cast zinc (Stallion Eclipse) with a plastic cover. The 10-foot (3.05 m) rail systems utilize two intermediate bottom rail supports (located at the one-third point), while the 8-foot and 6-foot (2.44 m and 1.83 m) rail systems utilize one intermediate bottom rail support located at the midspan.

Each rail configuration is defined according to end use, which may be for (1) one- and two-family dwellings (under the IBC and IRC), (2) residential use, or (3) any occupancy groups. Aluminum inserts can be in both top and bottom rails

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or in the top rail only. Refer to Sections 4.2.3.1 through 4.2.3.4, and Table 1, for insert installation requirements.

3.2.3 Durability: When subjected to weathering, insect attack, and other decaying elements, the material used to manufacture the VEKA Vinyl Guardrail System is equivalent in durability to code-complying, preservative-treated or naturally durable lumber when used in locations described in Section 2.0 of this report. The VEKA Vinyl Guardrail System has been evaluated for structural performance when exposed to temperatures from -20°F (-29°C) to 125°F (52°C).

3.2.4 Surface-burning Characteristics: When tested in accordance with ASTM E 84, the VEKA Vinyl Guardrail System PVC has a flame-spread index of no greater than 200.

4.0 DESIGN AND INSTALLATION

4.1 General:

Installation of the VEKA Vinyl Guardrail System must comply with this report and the manufacturer's published installation instructions. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.

4.2 Guards:

4.2.1 General: Refer to Figures 1 through 4 for component cross sections and guard assemblies.

4.2.2 Structural: The VEKA Vinyl Guardrail System is satisfactory to resist the loads specified in Section 1607.7.1 of the IBC and Table R301.5 of the IRC, when installed at a maximum 10-foot (3.05 m), inside-to-inside post spacing. When the railing is supported on one or both ends by the supporting construction, the maximum distance must be measured from edge-of-post to edge-of-structure or from edge-of-structure to edge-of-structure.

4.2.3 Installation:

4.2.3.1 VEKA Vinyl Guardrail Post Sleeves: The VEKA Vinyl Guardrail must be fastened to posts or a structure, that comply with the applicable code.

4.2.3.2 Guardrail Systems for One- and Two-family Dwellings (IBC or IRC):

4.2.3.2.1 Whitman PVC Guardrail System with Alpine AWM Brackets: The Whitman guardrail system is a 6-foot-long assembly in which both the top and bottom rails are hollow, 2-inch-by-3¹/₂-inch, rectangular members. The assembly has aluminum inserts in the top rail only. The rails are attached to a post and sleeve, rigid column or building wall with plastic brackets secured with four No. 12 by 1¹/₂-inch-long stainless steel wood screws. The rail end slides over the bracket and is secured to the bracket with four No. 12 by ³/₄-inch-long, self-drilling, stainless steel sheet metal screws. The pickets are 1¹/₂ inches square, having either thin or regular walls, 1¹/₂ inches blow-molded Alpine Spindle, 1¹/₄ inches square, 1¹/₂ inches injection-molded spindle, 1¹/₂ inches by ⁷/₈ inch rectangular or 1 inch square and are spaced 3.094 inches apart (open clear space). The top and bottom rails are routed to accept the pickets with no further attachment.

4.2.3.2.2 Whitman PVC Guardrail System with LMT Brackets: The Whitman guardrail system is a 6-foot-long assembly in which both the top and bottom rails are hollow, 2-inch-by-3¹/₂-inch, rectangular members. The assembly has aluminum inserts in the top rail only. The rails are attached to a post and sleeve, rigid column or building wall with plastic brackets secured with four No. 10 by 2¹/₄-inch-long stainless steel wood screws. The rail end slides over the bracket and is secured to the bracket with four No. 10 by ³/₄-inch-long,

self-drilling, stainless steel sheet metal screws. The pickets are 1¹/₂ inches square, having either thin or regular walls, 1¹/₂ inches blow-molded Alpine Spindle, 1¹/₄ inches square, 1¹/₂ inches injection-molded spindle, 1¹/₂ inches by ⁷/₈ inch rectangular or 1 inch square and are spaced 3.094 inches apart (open clear space). The top and bottom rails are routed to accept the pickets with no further attachment.

4.2.3.2.3 Conrad PVC Guardrail System with LMT

Brackets: The Conrad guardrail system is a 10-foot-long assembly in which the top rail is a hollow T-section and the bottom rail is a hollow, 2-inch-by-3¹/₂-inch, rectangular member. The 10-foot assembly has an aluminum insert in the top rail only. The rails are attached to a post and sleeve, rigid column or building wall with a molded LMT plastic bracket secured with six No. 10 by 2¹/₄-inch-long, stainless steel wood screws in the top bracket and four in the bottom bracket. The rail end slides into the bracket and is secured to the bracket with two No. 10 by ³/₄-inch-long, self-drilling, sheet metal screws located on opposite sides of the bracket. The pickets are 1¹/₂ inches square, having either thin or regular walls, 1¹/₂ inches blow-molded Alpine Spindle, 1¹/₄ inches square, 1¹/₂ inches injection-molded spindle, 1¹/₂ inches by ⁷/₈ inch rectangular or 1 inch square and are spaced 3.360 inches apart (open clear space). The top and bottom rails are routed to accept the pickets with no further attachment.

4.2.3.2.4 Conrad PVC Guardrail System with Stallion

Brackets: The Conrad guardrail system is a 10-foot-long assembly in which the top rail is a hollow T-section and the bottom rail is a hollow, 2-inch-by-3¹/₂-inch, rectangular member. The assembly has aluminum inserts in the top rail only. The rails are attached to a post and sleeve, rigid column or building wall with a Stallion die cast zinc bracket secured with six No. 10 by 2-inch-long, stainless steel wood screws in both the top and bottom bracket. The rail end slides into the bracket and is secured to the bracket with two No. 10 by 1-inch-long, self-drilling, stainless steel sheet metal screws located on opposite sides of the bracket. The pickets are 1¹/₂ inches square, having either thin or regular walls, 1¹/₂ inches blow-molded Alpine Spindle, 1¹/₄ inches square, 1¹/₂ inches injection-molded spindle, 1¹/₂ inches by ⁷/₈ inch rectangular or 1 inch square and are spaced 3.360 inches apart (open clear space). The top and bottom rails are routed to accept the pickets with no further attachment.

4.2.3.3 Guardrail Systems Limited to Group R Occupancy Use and IRC: Conrad PVC Guardrail System

with AWM Brackets: The Conrad guardrail system with AWM brackets for residential use is a 10-foot-long assembly in which the top rail is a hollow T-shape and the bottom rail is a hollow, 2-inch-by-3¹/₂-inch, rectangular member. The assembly has aluminum inserts in the top rail only. The rails must be attached to a post and sleeve, rigid column or building wall with a molded AWM plastic bracket secured with four No. 12 by 1¹/₂-inch-long stainless steel wood screws in both the top and bottom bracket. The rail end slides into the bracket and is secured to the bracket with four No. 12 by ³/₄-inch-long, self-drilling, stainless steel sheet metal screws located on opposite sides of the bracket. The pickets are 1¹/₂ inches square, having either thin or regular walls, 1¹/₂ inches blow-molded Alpine Spindle, 1¹/₄ inches square, 1¹/₂ inches injection-molded spindle, 1¹/₂ inches by ⁷/₈ inch rectangular or 1 inch square and are spaced 3.360 inches apart (open clear space). The top and bottom rails are routed to accept the pickets with no further attachment.

4.2.3.4 Guardrail Systems for Any Occupancy Group:

4.2.3.4.1 Conrad PVC Guardrail System with LMT

Brackets: The Conrad guardrail system with LMT brackets for nonresidential use is an 8-foot-long assembly in which the top rail is a hollow T-shape and the bottom rail is a hollow,

2-inch-by-3 $\frac{1}{2}$ -inch, rectangular member. The assembly has aluminum inserts in the top rail only. The rails must be attached to a post and sleeve, rigid column or building wall with a molded LMT plastic bracket secured with six No. 10 by 2 $\frac{1}{4}$ -inch-long stainless steel wood screws in both the top and bottom bracket. The rail end slides into the bracket and is secured to the bracket with four No. 10 by $\frac{3}{4}$ -inch-long, self-drilling, stainless steel sheet metal screws located on opposite sides of the bracket. The pickets are 1 $\frac{1}{2}$ inches square, having either thin or regular walls, 1 $\frac{1}{2}$ inches blow-molded Alpine Spindle, 1 $\frac{1}{4}$ inches square, 1 $\frac{1}{2}$ inches injection-molded spindle, 1 $\frac{1}{2}$ inches by $\frac{7}{8}$ inch rectangular or 1 inch square and are spaced 3.375 inches apart (open clear space). The top and bottom rails are routed to accept the pickets with no further attachment.

4.2.3.4.2 Conrad PVC Guardrail System with AWM

Brackets: The Conrad guardrail system with AWM brackets for nonresidential use is an 8-foot-long assembly in which the top rail is a hollow T-shape and the bottom rail is a hollow, 2-inch-by-3 $\frac{1}{2}$ -inch, rectangular member. The assembly has aluminum inserts in the top rail only. The rails must be attached to a post and sleeve, rigid column or building wall with a molded AWM plastic bracket secured with four No. 12 by 1 $\frac{1}{2}$ -inch-long stainless steel wood screws in both the top and bottom bracket. The rail end slides into the bracket and is secured to the bracket with four No. 12 by $\frac{3}{4}$ -inch-long, self-drilling, stainless steel sheet metal screws located on opposite sides of the bracket. The pickets are 1 $\frac{1}{2}$ inches square, having either thin or regular walls, 1 $\frac{1}{2}$ inches blow-molded Alpine Spindle, 1 $\frac{1}{4}$ inches square, 1 $\frac{1}{2}$ inches injection-molded spindle, 1 $\frac{1}{2}$ inches by $\frac{7}{8}$ inch rectangular or 1 inch square and are spaced 3.375 inches apart (open clear space). The top and bottom rails are routed to accept the pickets with no further attachment.

4.2.3.4.3 Conrad PVC Guardrail System with Stallion

Brackets: The Conrad guardrail system with Stallion brackets for nonresidential use is an 8-foot-long assembly in which the top rail is a hollow T-shape and the bottom rail is a hollow, 2-inch-by-3 $\frac{1}{2}$ -inch, rectangular member. The assembly has aluminum inserts in the top rail only. The rails must be attached to a post and sleeve, rigid column or building wall with a Stallion die cast zinc bracket secured with six No. 10 by 2-inch-long stainless steel wood screws in both the top and bottom bracket. The rail end slides into the bracket and is secured to the bracket with four No. 10 by 1-inch-long, self-drilling, stainless steel sheet metal screws located on opposite sides of the bracket. The pickets are 1 $\frac{1}{2}$ inches square, having either thin or regular walls, 1 $\frac{1}{2}$ inches blow-molded Alpine Spindle, 1 $\frac{1}{4}$ inches square, 1 $\frac{1}{2}$ inches injection-molded spindle, 1 $\frac{1}{2}$ inches by $\frac{7}{8}$ inch rectangular or 1 inch square and are spaced 3.375 inches apart (open clear space). The top and bottom rails are routed to accept the pickets with no further attachment.

4.2.3.4.4 Majestic PVC Guardrail System with Stallion

Brackets: The Majestic guardrail system with Stallion brackets for nonresidential use is an 8-foot- or 10-foot-long assembly in which the top rail is a hollow ornamental shape and the bottom rail is a hollow, 2-inch-by-3 $\frac{1}{2}$ -inch, rectangular member. The 10-foot assembly has aluminum inserts in both the top and bottom rails. The 8-foot assembly has an aluminum insert in the top rail only. The 10-foot rails must be attached to a post and sleeve, rigid column or building wall with a Stallion die cast zinc bracket secured with six No. 10 by 2-inch-long flat-head stainless steel self-starting wood screws in both the top and bottom bracket. The 8-foot rails are attached with four screws. The rail end slides into the bracket and is secured to the bracket with two No. 12 by 1 $\frac{1}{4}$ -inch-long, self-drilling, stainless steel pan-head screws located on opposite sides of the bracket. The pickets are 1 $\frac{1}{2}$

inches square, having either thin or regular walls, 1 $\frac{1}{2}$ inches blow-molded Alpine Spindle, 1 $\frac{1}{4}$ inches square, 1 $\frac{1}{2}$ inches injection-molded spindle, 1 $\frac{1}{2}$ inches by $\frac{7}{8}$ inch rectangular or 1 inch square and are spaced 3.375 inches apart for the 8-foot-long rail and 3.360 inches apart for the 10-foot-long rail (open clear space). The top and bottom rails are routed to accept the pickets with no further attachment.

5.0 CONDITIONS OF USE

The VEKA Vinyl Guardrail Systems described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 This product is limited to exterior use as a guardrail system for balconies and porches and to the Occupancy Groups (IBC) stated in this report, and to structures constructed in accordance with the IRC.
- 5.2 Installation must comply with this report, the manufacturer's published installation instructions and the applicable code. When the manufacturer's published installation instructions differ from this report, this report governs.
- 5.3 The compatibility of the fasteners, metal mount components and other metal hardware with the supporting construction, including chemically treated wood, is outside the scope of this report.
- 5.4 The VEKA Vinyl Guardrail System must be directly fastened to supporting construction having adequate strength and stiffness. Where required by the code official, engineering calculations and construction documents consistent with this report must be submitted for approval. The calculations must verify that the supporting construction complies with the applicable building code requirements and is adequate to resist the loads imparted upon it from the products and systems discussed in this report. The documents must contain details of the attachment to the supporting structure consistent with the requirements of this report. The documents must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.5 The top rail component of the VEKA Vinyl Guardrail System must not be permitted to be used as a handrail for stairways or ramps.
- 5.6 The use of wood posts, with or without post sleeves, is outside the scope of this report.
- 5.7 The use of the 36-inch rail assemblies must be limited to one- and two-family dwellings.
- 5.8 The VEKA Vinyl Guardrail System is produced in Youngstown, Ohio, under a quality control program with inspections by Architectural Testing, Inc. (AA-676).

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails) (AC174), dated February 2007.

7.0 IDENTIFICATION

The VEKA Vinyl Guardrail System described in this report is identified by a stamp, on each individual piece or on the packaging, bearing the manufacturer's name (VEKA), the product type, the name of the inspection agency (Architectural Testing, Inc.), and the ICC-ES evaluation report number (ESR-1850). The 36-inch-high rail sections must also include the phrase "For Use in One- and Two-Family Dwellings Only."

TABLE 1—MAXIMUM GUARDRAIL SYSTEM SPANS¹

PRODUCT NAME/COMPONENT	APPLICABLE BUILDING CODE ^{2,6}		MAXIMUM SPAN ^{3,4} (ft.-in.)
	IBC	IRC	
Conrad railing assembly with AWM mounts For Group R Occupancy and the IRC (top rail reinforced)	Yes	Yes	10 - 0
Conrad railing assembly with LMT mounts For all Occupancy Groups and the IRC (top rail reinforced)	Yes	Yes	8 - 0
Conrad railing assembly with AWM mounts For all Occupancy Groups and the IRC (top rail reinforced)	Yes	Yes	8 - 0
Whitman railing assembly with AWM mounts For One- and Two-Family Dwelling Only (top rail reinforced)	Yes ⁵	Yes	6 - 0
Whitman railing assembly with LMT mounts For One- and Two-Family Dwelling Only (top rail reinforced)	Yes ⁵	Yes	6 - 0
Conrad railing assembly with LMT mounts For One- and Two-Family Dwelling Only (top rail reinforced)	Yes ⁵	Yes	10 - 0
Conrad railing assembly with Stallion brackets For One- and Two-Family Dwelling Only (top rail reinforced)	Yes ⁵	Yes	10 - 0
Conrad railing assembly with Stallion Brackets For all Occupancy Groups and the IRC (top and bottom rails reinforced)	Yes	Yes	8 - 0
Majestic railing assembly with Stallion Brackets For all Occupancy Groups and the IRC (top and bottom rails reinforced)	Yes	Yes	10 - 0
Majestic railing assembly with Stallion Brackets For all Occupancy Groups and the IRC (top rail reinforced)	Yes	Yes	8 - 0

For **SI**: 1 inch = 25.4 mm, 1 foot = 305 mm.

¹The ability of the supporting construction to resist the reactionary loads must be justified to the satisfaction of the code official.

²Indicates compliance with the respective building codes.

³Maximum span is measured from edge-of-post to edge-of-post.

⁴Maximum allowable span has been adjusted for durability. No further increases are permitted.

⁵These rail assemblies meet the One- and Two-family Dwelling requirements of Section 1607.7.1 of the IBC.

⁶The minimum height of the top rail is 42 inches for the IBC (Section 1013.2) and 36 inches for the IRC (Section R312).

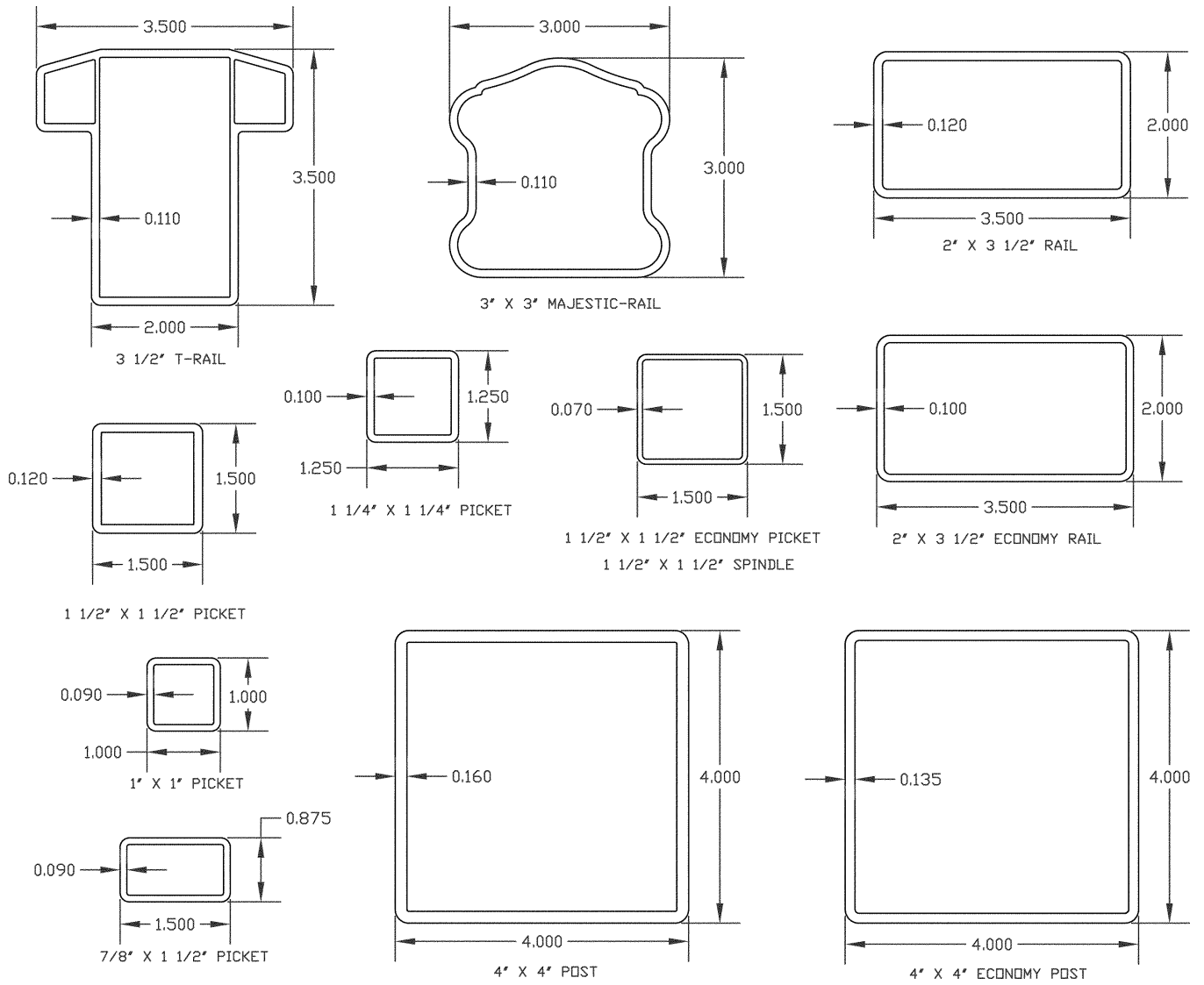


FIGURE 1

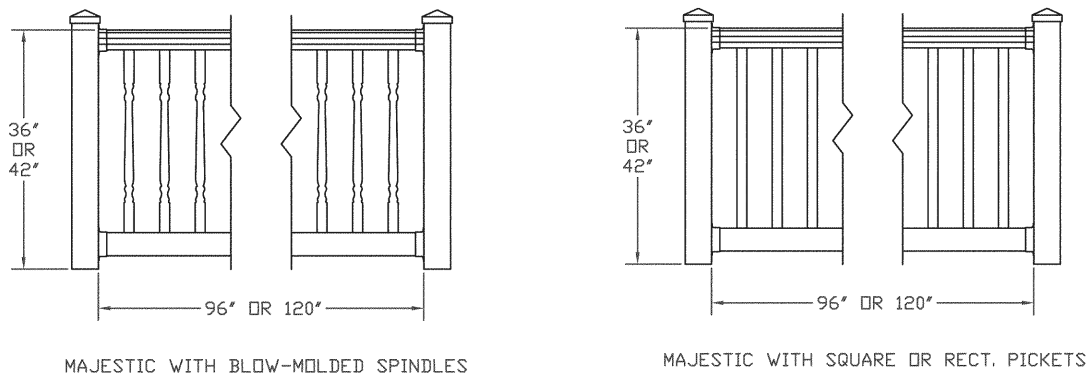
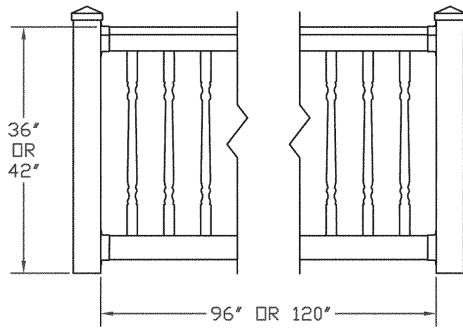
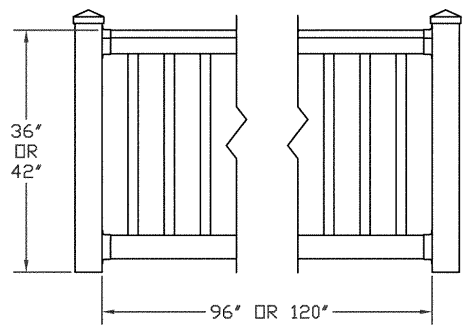


FIGURE 2

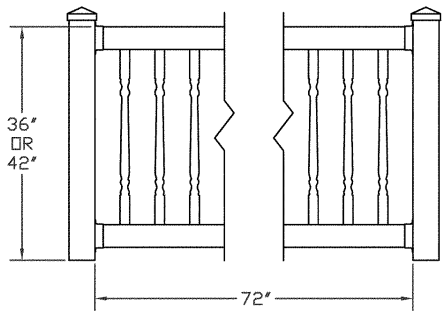


CONRAD WITH BLOW-MOLDED SPINDLES

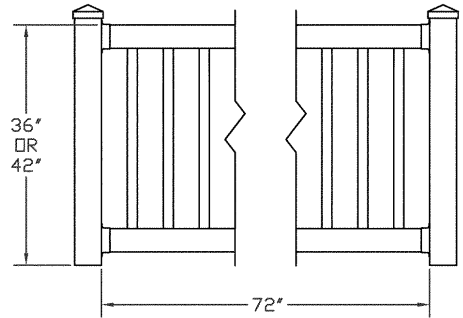


CONRAD WITH SQUARE OR RECT. PICKETS

FIGURE 3



WHITMAN WITH BLOW-MOLDED SPINDLES



WHITMAN WITH SQUARE OR RECT. PICKETS

FIGURE 4