



Code Compliance Research Report

CCRR-0138

Subject to Renewal: 05/20/2012
Visit www.archtest.com for current status

Issued: 05/20/2010
Page 1 of 8

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1.0 Subject

VEKA Vinyl Guardrail Systems

Whitman system
Regal system
Majestic system
Conrad system
Stanfield system
Trustin system

Building And Industrial Wholesale Company Fifth Street Vinyl Guardrail Systems

Whitman system
Regal system
Majestic system
Conrad system
Stanfield system
Trustin system

2.0 Research Scope

2.1. Building Codes:

2009 International Building Code (IBC)
2009 International Residential Code (IRC)

2006 International Building Code (IBC)
2006 International Residential Code (IRC)

2.2. Properties:

Structural Performance
Durability
Surface Burning
Decay Resistance
Termite Resistance

3.0 Description

3.1. General – The VEKA and Building And Industrial Wholesale Company Vinyl Guardrail Systems described in this report are guards and guardrails under the definitions of the referenced codes. They are intended for use at or near the open sides of elevated walking areas of buildings and walkways as required by the referenced codes.

3.2. Guardrail systems include a top and bottom rail, with or without aluminum inserts (See Table 1), vertical balusters, post sleeves, rail-to-post brackets, foot blocks and decorative moldings.

3.3. Rails, post sleeves, foot blocks, balusters and decorative moldings are Polyvinyl Chloride (PVC). PVC components are produced in three colors: White, Almond or Khaki. Galvanized, powder-coated iron balusters are also utilized and produced in various colors.

3.4. All top rails are provided with an aluminum insert (See Table 1). The top rail insert is either 6005A-T5 ("*Regal*" system) or 6063-T5 aluminum. See Figure 2.

3.5. The bottom rail is supplied with or without an aluminum insert (See Table 1). The bottom rail insert is 6063-T5 aluminum alloy. See Figure 2.

3.6. Level guards with heights of 36 inches or 42 inches above the floor surface are provided in lengths up to 10 feet as measured from inside-to-inside of supports. See Table 1.

3.7. The top assembly consists of one rail, and is attached to each support with a single bracket. The top rail may be a T-shape, an ornamental shape or a rectangular shape. See Figure 1.

3.8. The bottom assembly consists of one rail, and is attached to each support with a single bracket. The bottom rail is a rectangular shape measuring 2 inches wide and 3.5 inches deep. See Figure 1.

3.9. Balusters are blow-molded PVC, co-extruded PVC or galvanized powder-coated iron and are supplied in various dimensions and styles. See Figures 1 and 2. The balusters are placed through routed openings in both the top and bottom rails to provide a means for securing the balusters in the rails. See Figures 3 and 4.

3.10. The baluster spacing resulting from assemblies recognized in this report shall provide spacing such that a 4 inch diameter sphere cannot pass through any opening between balusters.

3.11. The rail assembly utilizing the T-shaped top rail and the rectangular bottom rail is referred to as the "*Conrad*" or "*Trustin*" system. The rail assembly utilizing the ornamental shaped top rail and rectangular bottom rail with Vision PVC brackets is referred to as the "*Regal*" system. The rail assembly utilizing the ornamental shaped top rail and rectangular bottom rail with Stallion Die-Cast brackets is referred to as the "*Majestic*" system. The rail assembly utilizing the rectangular rail for both the top and bottom rails is referred to as the "*Whitman*" or "*Stanfield*" system. See Figure 1.

3.12. Post sleeves are 4 inches square and have a wall thickness of either 0.16 inch or 0.135 inch. See Figure 5.

3.13. The LMT, AWM and Vision mounting brackets are molded plastic. The Stallion mounting brackets are made from die cast zinc or aluminum with a plastic cover. See Table 1.

4.0 Performance Characteristics

4.1. The guardrail systems described in this report have demonstrated the capacity to resist the design loadings specified in Chapter 16 of the IBC and Section R301 of the IRC when tested in accordance with ICC-ES AC174.

4.2. Structural performance has been demonstrated for a temperature range from -20°F to 125°F.

4.3. Materials used are deemed equivalent to preservative treated or naturally durable wood for resistance to weathering effects, decay, and attack from termites.

4.4. PVC materials used have a flame spread index of 45 when tested according to ASTM E 84. The referenced criteria within AC174, requires a flame spread index not exceeding 200 when tested in accordance with ASTM E 84.

5.0 Installation

5.1. Installation shall be in accordance with the manufacturer's installation instructions and this report. Where differences occur between this report and the manufacturer's installation instructions, this report shall govern.

5.2. The top and bottom rail assemblies are attached to PVC sleeved conventional wood posts or other supporting structure with a mounting bracket. See Table 1.

5.3. One mounting bracket attaches to each end of the upper rail. The brackets are attached to the supports. See Tables 1 and 3 for attachment details.

5.4. One mounting bracket attaches to each end of the lower rail. The brackets are attached to the supports. See Tables 1 and 3 for attachment details.

5.5. Foot blocks are intermediate bottom rail supports and are installed between the deck surface and the rail. Two supports are used for the 10 foot rail systems and are located at the one-third points. The 6 and 8 foot rails systems utilize one intermediate support located at the mid-point.

5.6. The wood in the supporting structure including support posts shall have a specific gravity of 0.50 or greater (Southern Yellow Pine or better) and a minimum thickness to allow full penetration of the bracket mounting screws.

6.0 Supporting Evidence

6.1. Drawings and installation instructions submitted by the manufacturer.

6.2. The reports of testing and engineering analysis demonstrating compliance with the performance requirements of ICC-ES AC174 "Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails)", effective April 1, 2008.

6.3. The reports of testing and engineering analysis demonstrating compliance with the performance requirements of ASTM D 7032-04.

6.4. A quality control manual that is in accordance with the ICC-ES AC10, "Acceptance Criteria for Quality Documentation", effective July 1, 2008.

7.0 Conditions of Use

The guardrail assemblies identified in this report are deemed to comply with the intent of the provisions of the referenced building codes subject to the following conditions.

7.1. Guards recognized in this report and regulated by the IBC or IRC are limited to exterior use in all construction types where wood is permitted in accordance with Section 1406.3 of the IBC and in One and Two Family Dwellings regulated by the IRC.

7.2. Conventional wood supports including support posts for guards are not within the scope of this report and are subject to evaluation and approval by the building official. Supports must satisfy the design load requirements specified in Chapter 16 of the IBC and must provide suitable material for anchorage of the rail brackets (See 5.6 under "Installation"). Where required by the building official, engineering calculations and details prepared by a licensed design professional shall be provided.

7.3. Compatibility of fasteners and other metallic components with the supporting structure, including chemically treated wood, is not within the scope of this report.

7.4. VEKA Vinyl Guardrail Systems are manufactured in Fombell, Pennsylvania by VEKA Inc. in accordance with the manufacturer's approved quality control system with inspections by Architectural Testing, Inc. (IAS - AA-676.).

7.5. Fifth Street Vinyl Guardrail Systems are manufactured in Parkersburg, West Virginia by Building And Industrial Wholesale Company in accordance with the manufacturer's approved quality control system with inspections by Architectural Testing, Inc. (IAS - AA-676.)

8.0 Identification

The composite guard assemblies produced by VEKA, Inc. and Building And Industrial Wholesale Company identified in this report, shall be identified with labeling on the individual components or the packaging and include the following;

8.1. Name and/or trademark of the manufacturer.

8.2. The identifying mark of the independent inspection agency, (IAS - AA-676)

8.3. The ATI Code Compliance Research Report Number (CCRR-0138)

9.0 Code Compliance Research Report Use

9.1. Approval of building products and/or materials can only be granted by a building official having legal authority in the specific jurisdiction where approval is sought.

9.2. Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product by Architectural Testing.

9.3. Reference to the Architectural Testing internet web site address at www.archtest.com is recommended to ascertain the current version and status of this report.

Table 1

Guard System	Rail Inserts	Rail Brackets ⁴		Balusters ⁵	Maximum Rail Length ^{1, 2, 3} (ft.-in.)
		Top	Bottom		
One- And Two-Family Dwellings Only (IRC)					
Whitman	Top Only	AWM	AWM	1, 2, 3, 4, 5, 6	6' - 0"
Whitman	Top Only	LMT	LMT	1, 2, 3, 4, 5, 6	6' - 0"
Conrad	Top Only	LMT	LMT	1, 2, 3, 4, 5, 6	10' - 0"
Conrad	Top Only	Stallion Die Cast	Stallion Die Cast	1, 2, 3, 4, 5, 6	10' - 0"
Stanfield	Top And Bottom	Stallion Aluminum	Stallion Aluminum	1, 2, 3, 4, 5, 6, 7	8' - 0"
Trustin	Top And Bottom	Stallion Aluminum	Stallion Aluminum	1, 2, 3, 4, 5, 6, 7	8' - 0"
IRC and Group R Occupancy / IBC					
Conrad	Top Only	AWM	AWM	1, 2, 3, 4, 5, 6	10' - 0"
All IBC Occupancies and IRC					
Conrad	Top Only	LMT	LMT	1, 2, 3, 4, 5, 6	8' - 0"
Conrad	Top Only	AWM	AWM	1, 2, 3, 4, 5, 6	8' - 0"
Conrad	Top Only	Stallion Die Cast	Stallion Die Cast	1, 2, 3, 4, 5, 6	8' - 0"
Majestic	Top And Bottom	Stallion Die Cast	Stallion Aluminum	1, 2, 3, 4, 5, 6	8' - 0"
Regal	Top And Bottom	Vision PVC	Vision PVC	1, 2, 3, 4, 5, 6	8' - 0"
Stanfield	Top And Bottom	Stallion Aluminum	Stallion Aluminum	1, 2, 3, 4, 5, 6	8' - 0"
Trustin	Top And Bottom	Stallion Aluminum	Stallion Aluminum	1, 2, 3, 4, 5, 6	8' - 0"

¹ The supporting structure must be constructed to the satisfaction of the code official. See 7.2 under "Conditions of Use"

² Maximum rail length is measured from inside-to-inside of supports.

³ The minimum height of the top rail is 42 inches for the IBC (Section 1013.2) and 36 inches for the IRC (Section R312).

⁴ Refer to the Bracket fastening schedule.

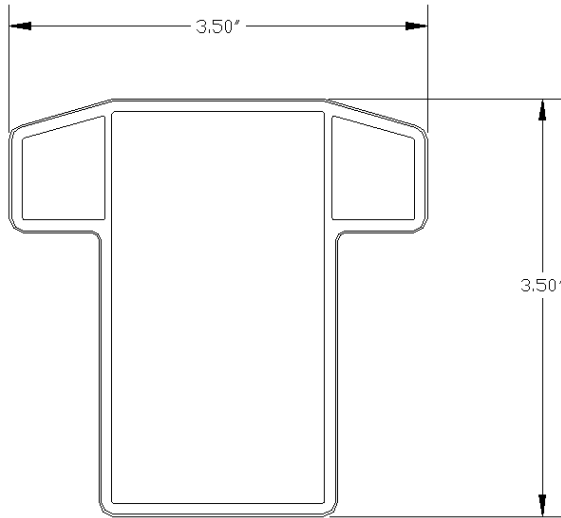
⁵ Refer to the Baluster schedule. Baluster style #7 is limited to use in 36" Guardrail heights.

Table 2

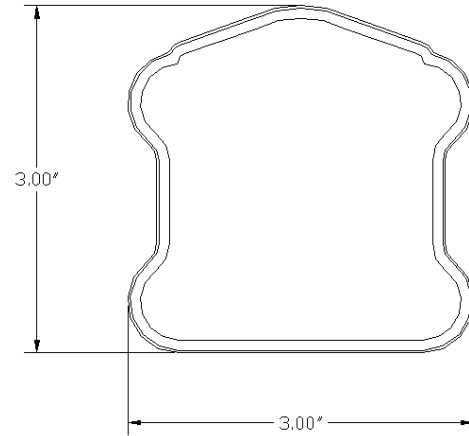
Code #	Baluster Schedule
1	1 inch square PVC picket
2	7/8 inch by 1-1/2 inch rectangular picket
3	1-1/4 inch square picket
4	1-1/2 inch square picket
5	1-1/2 inch square picket (Economy)
6	1-1/2 inch by 1-1/2 inch molded PVC spindle
7	3/4 inch galvanized powder coated iron balusters

Table 3

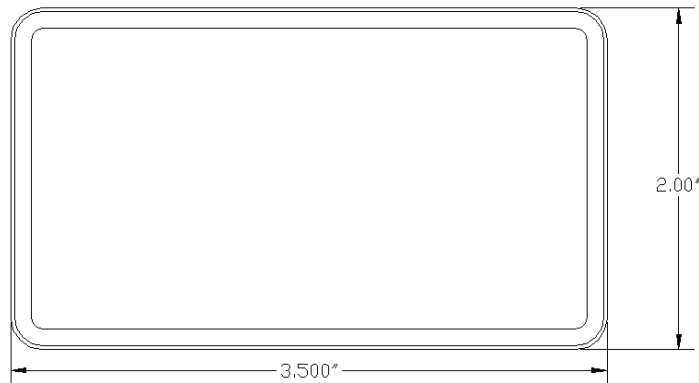
Bracket	Fastening	
	Bracket To Post	Bracket To Rail
AWM	4 - #12 x 1/1/2" stainless steel wood screws	4 - #12 x 3/4" stainless steel pan-head screws
LMT	4 - #10 x 2-1/4" stainless steel wood screws	4 - #10 x 3/4" stainless steel pan-head screws
Stallion Die Cast	4 - #10 x 2" stainless steel wood screws	2 - #10 x 1-1/4" stainless steel pan-head screws
Stallion Aluminum	6 - #10 x 2" stainless steel wood screws	4 - #10 x 1-1/4" stainless steel pan-head screws
Vision PVC	4 - #10 x 3/4" stainless steel pan-head screws	4 - #10 x 1" stainless steel pan-head screws



Conrad/Trustin

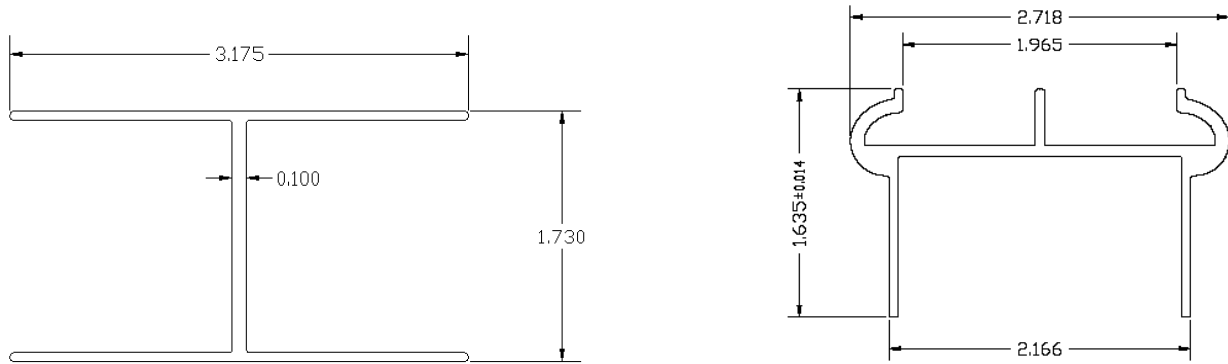


Regal/Majestic



Stanfield/Whitman Top Rail and Bottom Rail / All

Figure 1 – PVC Rail Profiles



Conrad/Trustin Top Rail
2 X 3.5 Bottom Rail

Regal/Majestic Top Rail

Figure 2 - Aluminum Rail Inserts

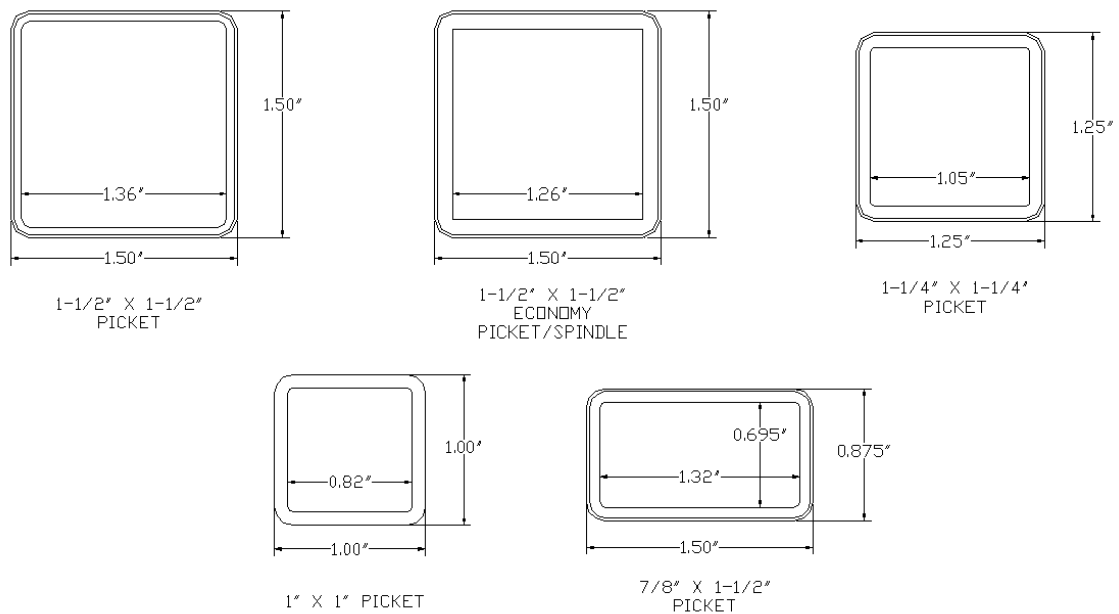
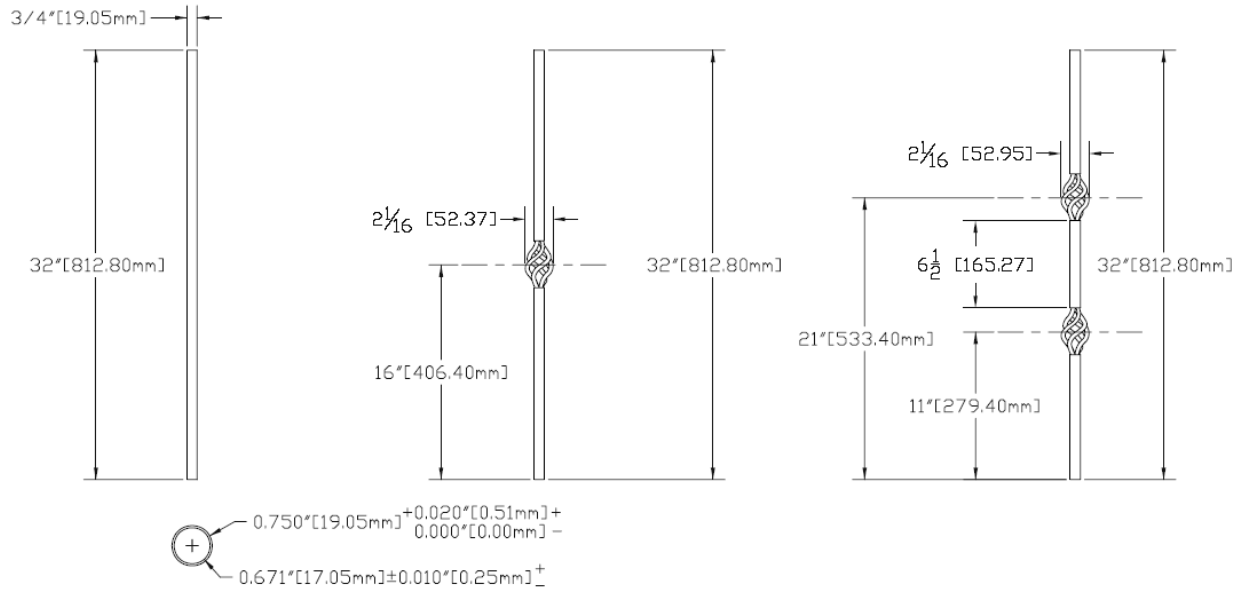
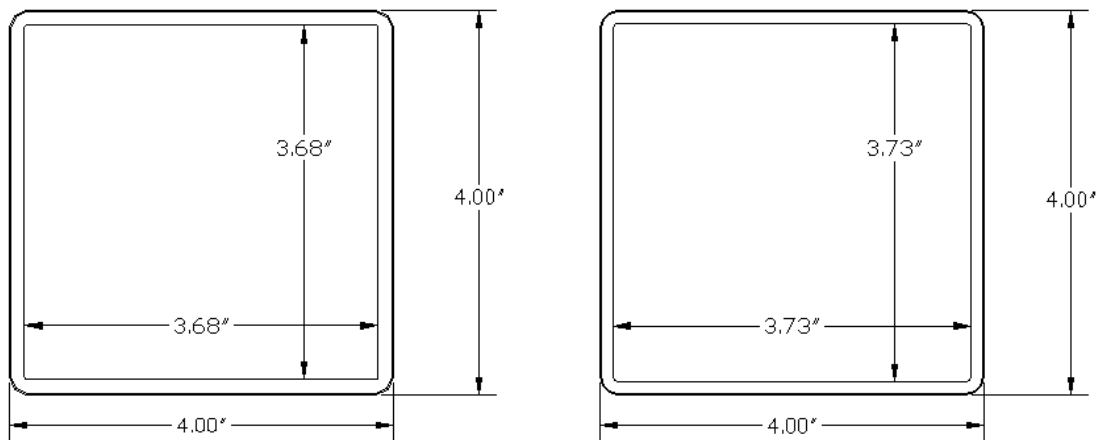


Figure 3 – PVC Baluster Profiles


Figure 4 – Iron Balusters

Figure 5 – PVC Post Sleeves