



## Code Compliance Research Report

## CCRR-0100

Subject to Renewal: 11/30/13  
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Page 1 of 8

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### 1. Subject

*Weatherwise*™ Vinyl Railing

Also identified as *Nx-Rail*® Vinyl Railing

*Baltimore, Windsor, Fairfield, Brookfield, Kenmore, Charleston, Manchester, and Lexington* Vinyl Guardrail Assemblies (Guards)

### 2. Research Scope

#### 2.1 Building Codes:

- 2009 International Building Code (IBC)
- 2009 International Residential Code (IRC)
- 2007 Florida Building Code (FBC)  
(Excluding the High Velocity Hurricane Zone)

#### 2.2 Properties:

- Structural Performance
- Durability
- Surface Burning

### 3. Description

3.1 General - *Weatherwise*™ vinyl railings are guardrails or guards under the definitions of the referenced codes intended for use on elevated walking areas in buildings and walkways as required by the codes. Guard systems are provided as level guards for level walking areas such as decks, balconies and porches, and sloped guards for open sides of stairways.

3.2 Materials and Processes - *Weatherwise*™ vinyl railings are an assemblage of extruded and molded components utilizing white Poly Vinyl Chloride (PVC) material with aluminum reinforcements and aluminum mounting brackets. All systems consist of the following components:

3.2.1 Top rails in the *Fairfield, Brookfield, Charleston, and Lexington* series are a "T"-Rail profile. See Figure 3.

3.2.2 Top rails in the *Baltimore, Windsor, Kenmore, and Manchester* series are a 2" wide by 3.5" tall rectangular profile with a wall thickness of 0.10". See Figure 4.

3.2.3 Bottom rails in all systems are a 2" wide by 3.5" tall rectangular profile. See Figure 4.

3.2.4 Balusters are 1.5" square and come in two styles. Pickets are 1.5" square throughout its length. Spindles are 1.5" square at the ends and blow molded to form a turned spindle shape through the mid-section of the length. See Figures 1 and 2.

3.3 Level 42-Inch High Guards - The *Baltimore, Windsor, Fairfield, and Brookfield* series are intended to serve as 42-inch high guards up to 10-feet in length for use in all residential use groups. See Table 1.

3.3.1 An extruded aluminum insert provides reinforcement in the top and bottom rail. A secondary extruded aluminum insert is used in the top rail for railing lengths exceeding 8-feet. See Figure 5.

3.4 Level 36-Inch High Guards - The *Kenmore, Charleston, Manchester, and Lexington* series are intended to serve as 36-inch high guards up to 8-feet in length for use only in One- and Two-Family Dwellings. See Table 2.

3.4.1 An extruded aluminum insert provides reinforcement in the top rail and bottom rail. See Figures 6 and 7.

3.5 Stair 42-Inch High Guards - The *Baltimore, Windsor, Fairfield, and Brookfield* series have an overall assembly height of approximately 42 inches projected vertically from the nose of the stair tread and have a maximum rail length of 8-feet. See Table 1.

3.6 Stair 36-Inch High Guards - The *Kenmore, Charleston, Manchester, and Lexington* series have an overall assembly height of approximately 36 inches projected vertically from the nose of the stair tread and have a maximum rail length of 8-feet. See Table 2.

3.7 All components utilized in the stair rail assembly are the same as those utilized in the corresponding level rails with the exception of the baluster length.

3.8 Routed baluster holes in the PVC stair rail sections are elongated to 1.9" to allow the baluster to rotate corresponding to the slope of the stair.

3.9 Top and bottom rails are connected to posts using aluminum brackets secured to the posts with stainless steel wood screws. See Figures 8 and 9.

3.10 A nonstructural 4 inch square PVC post sleeve is provided for 4x4 conventional wood posts. Code compliance assessment of conventional wood posts is not within the scope of this report. See Section 7, Conditions of Use, for further conditions.

#### **4. Performance Characteristics**

4.1 *Weatherwise*<sup>™</sup> vinyl railings have demonstrated their capacity to resist the design loads specified in Chapter 16 of the IBC and FBC 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 to produce *Weatherwise*<sup>™</sup> vinyl railings 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 50 when tested according to ASTM E 84. The reference criteria, AC174, requires a flame spread index not exceeding 200.

#### **5. Installation**

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.

5.1 Railing assemblies consist of top and bottom rails with pre-routed holes to receive balusters. Aluminum railing reinforcements are inserted in the rails during assembly as specified for the series/model (see Section 3, Description).

5.2 Ends of stair rails must be field cut to provide a flush mount with the supports.

5.3 Aluminum brackets are secured to the support posts with three #12 by 1-1/4" flat head stainless steel screws and secured to the rails with two #8 by 3/4" flat head stainless steel screws.

#### **6. Supporting Evidence**

6.1 Manufacturer's drawings and installation instructions.

6.2 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 July 1, 2010, and ASTM D 7032-07, Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails).

6.3 Quality control manual in accordance with ICC-ES AC10, Acceptance Criteria for Quality Documentation, effective March 1, 2009.

#### **7. 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 FBC are limited to exterior use in all construction types where wood is permitted in accordance with Section 1406.3 of the IBC and FBC and in One- and Two-Family Dwellings regulated by the IRC. 36-inch high guards are further limited to use in One- and Two-Family Dwellings (IRC and FBC-Residential).

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

7.3 Conventional 4x4 wood supports are outside the scope of this report and are subject to evaluation and approval by the building official.

7.4 Conventional 4x4 wood posts and structural support framing for post installations must satisfy the design load requirements specified in Chapter 16 of the building code and must provide suitable material for anchorage. Wood shall have a specific gravity of 0.50 or greater (Southern Yellow Pine or better). Where required by the building official, engineering calculations and details shall be provided.

7.5 Mid Atlantic Vinyl Products' *Weatherwise*™ Vinyl Railing is manufactured in Fredericksburg, VA in accordance with the manufacturer's approved quality control system with inspections by Architectural Testing (IAS AA-676).

### 8. Identification

Mid Atlantic Vinyl Products' *Weatherwise*™ Vinyl Railing produced in accordance with this report shall be identified with labeling on the individual components or the packaging that includes the following information:

8.1 Name and/or trademark of manufacturer

8.2 The following statement: "See CCRR-0100 at [www.ati-es.com](http://www.ati-es.com) for uses and performance levels."

8.3 The phrase: "For Use in One- and Two-Family Dwellings Only" for the 36" railing systems.

8.4 The Architectural Testing Code Compliance Research Report mark and number (CCRR-0100)

### 9. 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.ati-es.com](http://www.ati-es.com) is recommended to ascertain the current version and status of this report.

**Table 1 – *Weatherwise*™ Vinyl Railing IBC & FBC <sup>(1)</sup>**

Vinyl Railing System	Type	Maximum Guardrail Length <sup>(2)</sup>	Minimum Railing Heights <sup>(3)</sup>	Aluminum Rail Reinforcement	
				Top Rail	Bottom Rail
<i>Baltimore, Brookfield, Fairfield, &amp; Windsor</i>	Level	120"	42"	"Standard" H with secondary insert (Fig. 5)	"Standard" H (Fig. 5)
		96.375"	42"	"Standard" H (Fig. 5)	
	Stair	93.5"	42"	"Standard" H (Fig. 5)	

<sup>1</sup> All Use Groups

<sup>2</sup> Guardrail lengths are actual railing lengths, i.e. clear space between supports for level rails and sloping length of rail between supports for stair rails.

<sup>3</sup> Height is from the deck surface to the top of the top rail, which includes a 2 inch gap between the deck surface and the bottom of bottom rail.



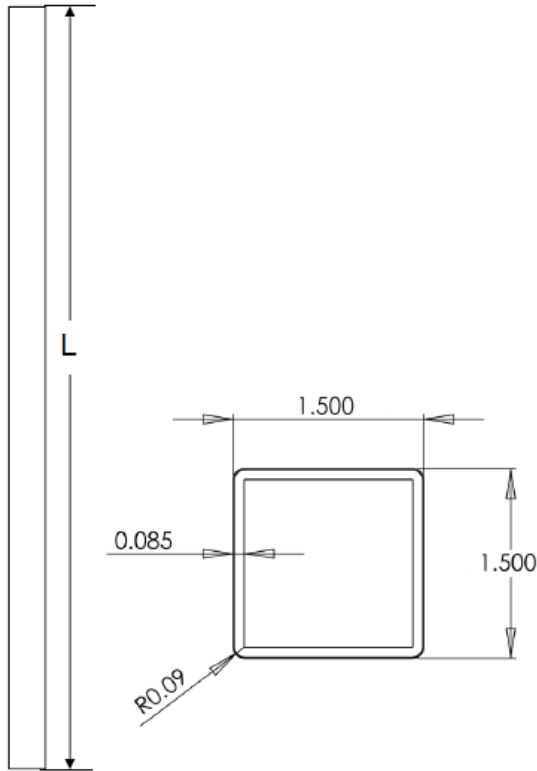
**Table 2 – Weatherwise™ Vinyl Railing IRC & FBC-Residential <sup>(1)</sup>**

Vinyl Railing System	Type	Maximum Guardrail Length <sup>(2)</sup>	Minimum Railing Heights <sup>(3)</sup>	Reinforcing Inserts	
				Top Rail	Bottom Rail
<i>Charleston, Kenmore, Lexington, &amp; Manchester</i>	Level	96.25"	36"	"Alternate" H (Fig. 6)	"L" insert (Fig. 7)
	Stair	93.75"	36"		

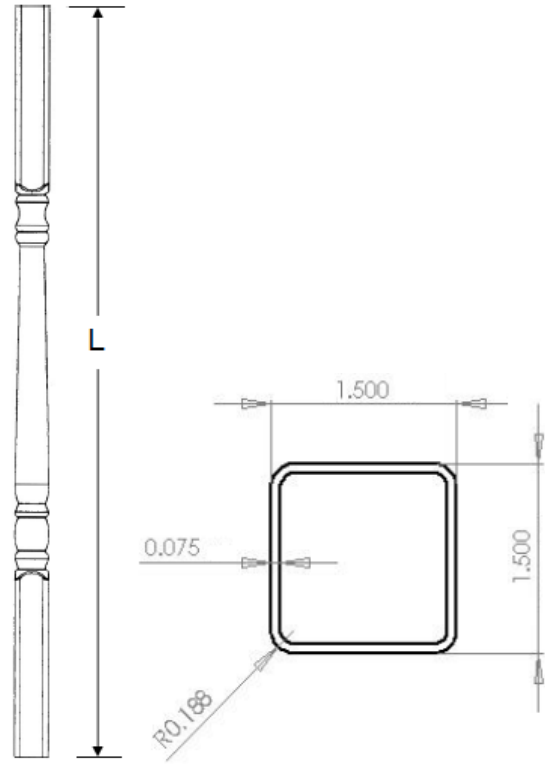
<sup>1</sup> Limited to exterior use as a guard system for balconies and porches for one- and two-family dwellings of Type V-B (IBC & FBC) construction and structures constructed in accordance with the IRC.

<sup>2</sup> Guardrail lengths are actual railing lengths, i.e. clear space between supports for level rails and sloping length of rail between supports for stair rails.

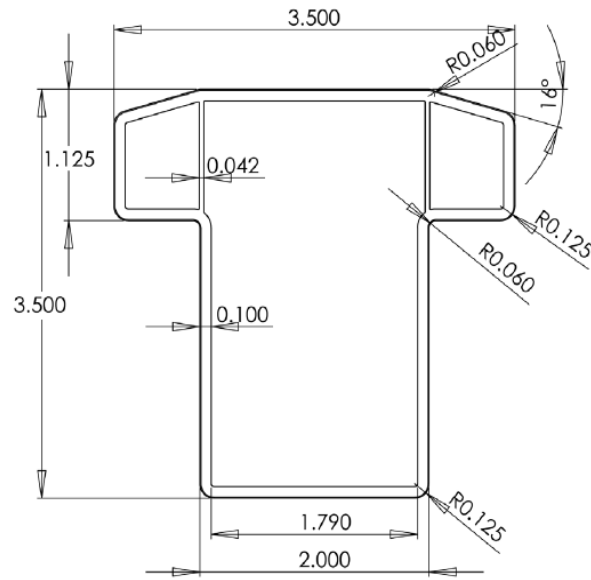
<sup>3</sup> Height is from the deck surface to the top of the top rail, which includes a 2 inch gap between the deck surface and the bottom of bottom rail.



**Figure 1 – Vinyl Picket**

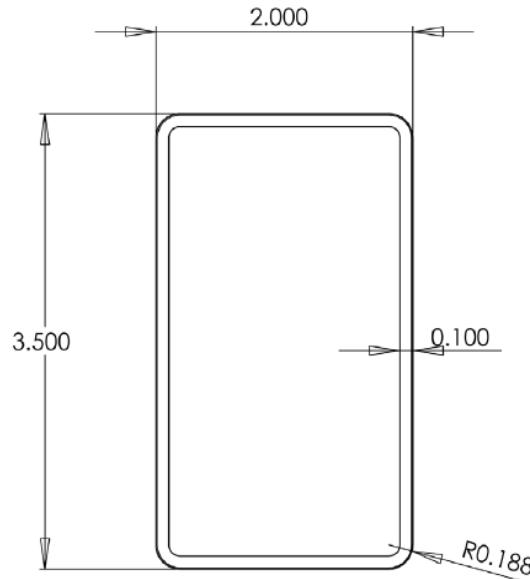


**Figure 2 – Vinyl Spindle**



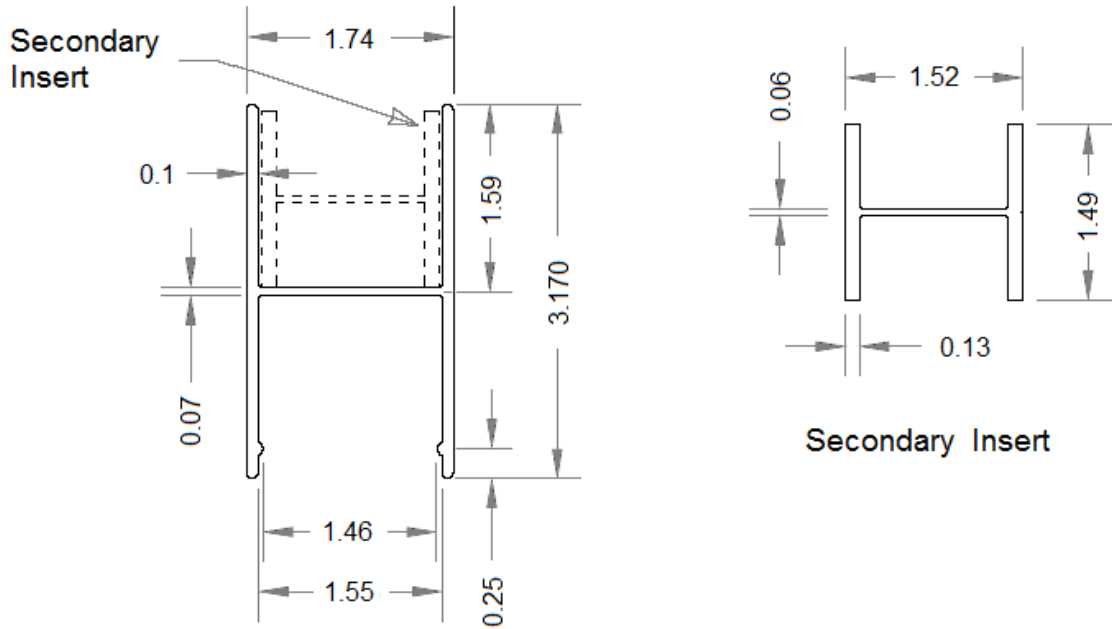
**Figure 3 – Vinyl “T” Rail**

\*Top rail for only the *Fairfield, Brookfield, Charleston, and Lexington* series

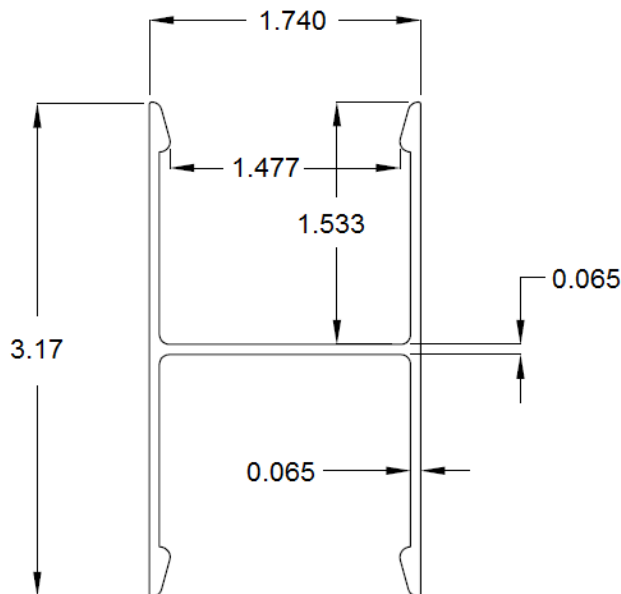


**Figure 4 – Vinyl 2” x 3.5” Rail**

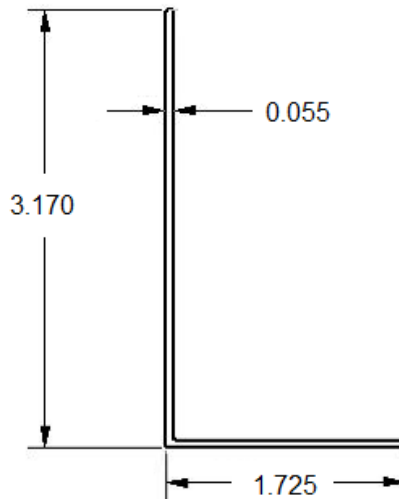
\*Top rail for only the *Baltimore, Windsor, Kenmore, and Manchester* series. Bottom rail for all *Weatherwise™* Vinyl Railings



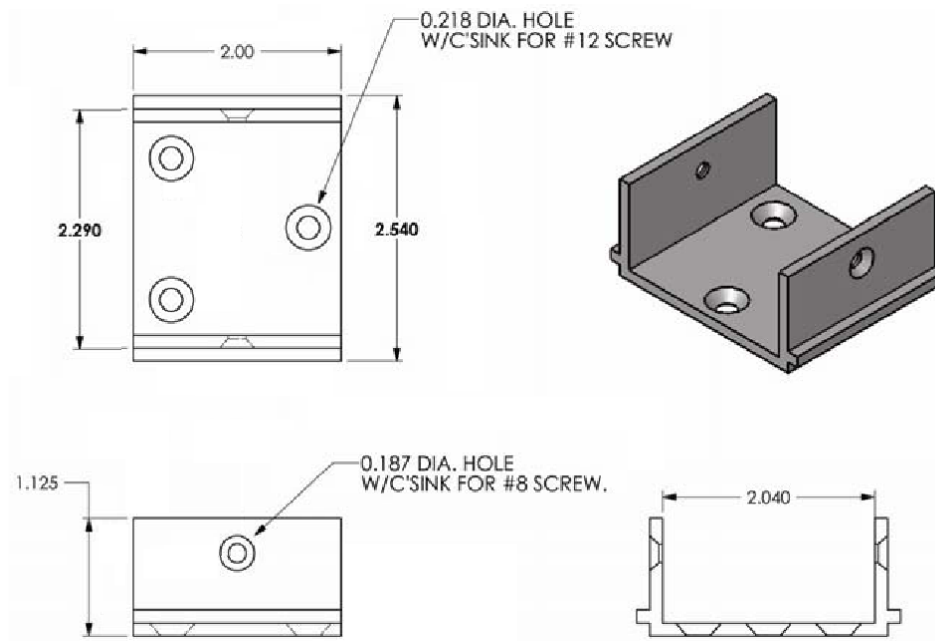
**Figure 5 – Aluminum “Standard” H Insert with Secondary Insert**  
 \*For Only the *Baltimore, Brookfield, Fairfield, & Windsor* series.



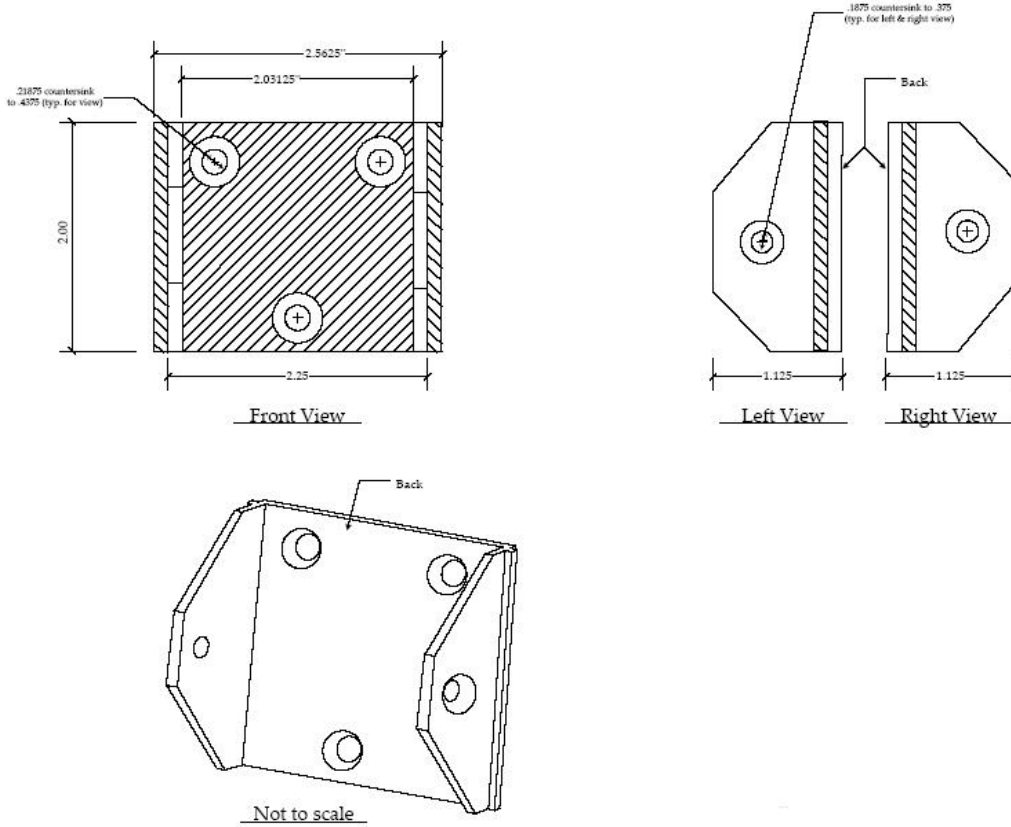
**Figure 6 – Aluminum “Alternate” H Insert**  
 (For Top Rail Only in *Kenmore, Charleston, Manchester, and Lexington*)



**Figure 7 - Aluminum "L" Insert**  
(For Bottom Rail Only in *Kenmore, Charleston, Manchester, and Lexington*)



**Figure 8 - Aluminum Level Rail Bracket**



**Figure 9– Aluminum Stair Rail Bracket**