



**U.S. FENCE, INC.**  
**7830 Freeway Circle**  
**Middleburg Heights, Ohio 44130**

## 1.0 Subject

*Williamsburg, Yorktown, Traditional, and Colonial Vinyl Guardrail Assemblies (Guards)*

## 2.0 Research Scope

### 2.1. Building codes:

2000, 2003 International Building Code (IBC)

2000, 2003 International Residential Code (IRC)

1999 BOCA National Building Code (BNBC)

### 2.2. Properties:

Structural performance

Durability

Surface Burning

## 3.0 Description

3.1. General – *Williamsburg, Yorktown, Traditional, and Colonial* railing systems 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.

3.2. Guard Assemblies - Railing systems are provided as level guards for level walking areas such as decks, balconies and porches, and sloped guards for open sides of stairways.

3.2.1. Level guards are provided in lengths up to 92-inches and have a 36-inch overall height which, provides a 39-inch guard height when installed with a 3-inch bottom clearance. See Figure 1

3.2.2. Stair guards are provided in lengths up to 65-3/4 inches horizontally projected between supports and 35-7/8 inches high projected vertically. See Figure 2.

3.3. Materials and Processes - Railings are an assemblage of extruded and molded components utilizing Poly Vinyl Chloride (PVC) material and aluminum reinforcements and mounting brackets. All systems consist of the following components:

3.3.1. The top rail for all models is a "Breadloaf" profile with overall dimensions 2.75" wide by 2.25" tall.

3.3.2. The bottom rail for all models is a rectangular profile 2.75" wide by 2.75" tall.

3.3.3. Balusters are 1.375" square and come in four styles distinguishing the four different models. One is 1.375" square throughout its length. All others are 1.375" square at the ends and are blow molded to form a turned spindle shape through the mid-section of their length. See Figure 3.

3.3.4. An extruded aluminum insert provides reinforcement for the top and bottom rails.

3.3.4.1. Aluminum reinforcement is utilized in top rails for all railing configurations and lengths.

3.3.4.2. Aluminum reinforcement is utilized in bottom rails for all railing lengths exceeding 67.75 inches.

3.3.5. Top and bottom rails are connected to posts with molded PVC brackets secured to the posts with stainless steel wood screws.

3.3.6. Level rails utilize a one-piece molded socket bracket that receives the end of the top or bottom rail.

3.3.7. Stair rails utilize a two-piece "Angle Wizard" bracket that is adjustable to the slope of the rail. A molded socket bracket that receives the end of the top or bottom rail is mounted to a stationary base and is adjustable to the slope of the stair.

3.3.8. PVC post sleeves are non-structural and provide a vinyl cover for conventional 4x4 wood posts.

3.3.9. Bottom rails have an intermediate support located beneath the rail at mid-span for railing lengths exceeding 67.75 inches.

## 4.0 Performance Characteristics

4.1. *U.S. Fence* vinyl railings have demonstrated the capacity to resist the design loadings specified in Chapter 16 of the IBC and BOCA codes when tested in accordance with ICC-ES AC174 for uses limited to One- and Two-Family Dwellings.



4.2. Structural performance has been adequately 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 15 when tested according to ASTM E 84. The referenced criteria, AC174, requires a flame spread index not exceeding 200.

## 5.0 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 type and length of railing.

5.2. Guards are attached to wood supports with molded PVC brackets that utilize stainless steel wood screws for anchorage.

5.2.1. Brackets for level guards utilize #10 by 1-1/4" stainless steel screws. Top rail brackets are secured with two screws and bottom rail bracket are secured with four screws.

5.2.2. Brackets for stair rails utilize #10 by 1-1/2" stainless steel screws. Top and bottom rail brackets are secured with four screws.

5.2.3. The wood in the supporting structure 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. Manufacturer's drawings and installation instructions.

6.2. Reports of testing in accordance with ICC-ES Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails), AC174 approved June 2005, effective July 1, 2005.

6.3. Quality control manual in accordance with ICC-ES Acceptance Criteria for Quality Control Manuals, AC10, approved October 2004, editorially amended April 2005.

## 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. Guardrails are limited to use in residential use groups (Group R) of Type V-B (IBC) and Type 5B (BNBC) construction and are further limited to use in One- and Two Family Dwellings (IRC).

7.2. Guardrail supports 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 building code and must provide suitable material for anchorage of the rail brackets. Where required by the building official, engineering calculations and details shall be provided.

7.3. 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.

7.4. All systems are manufactured in Bulls Gap, Tennessee in accordance with the manufacturer's approved quality control system with inspections by Architectural Testing, Inc. (AA-676).

## 8.0 Identification

The vinyl guardrail assemblies produced by U.S. Fence, Inc. and identified in this report shall be identified with labeling on the individual components or the packaging that includes the name and/or trademark of the manufacturer (U.S. Fence, Inc.), the identifying mark of the independent inspection agency, Architectural Testing, Inc. (AA-676) and, the ATI Code Compliance Research Report Number (CCRR-0102).

## 9.0 Code Compliance Research Report Use

9.1. Approval of "alternative products" can only be granted by a building official having legal authority in the specific jurisdiction where approval is sought. Code Compliance Research Reports published by ATI constitute a qualified independent opinion for consideration by the Code Official to assist in his/her determination of whether the "alternative product" satisfies the building code requirements for his/her jurisdiction.



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

9.3. Reference to the Architectural Testing internet web site address at [www.archtest.com](http://www.archtest.com) is recommended to ascertain the current version and status of this report.

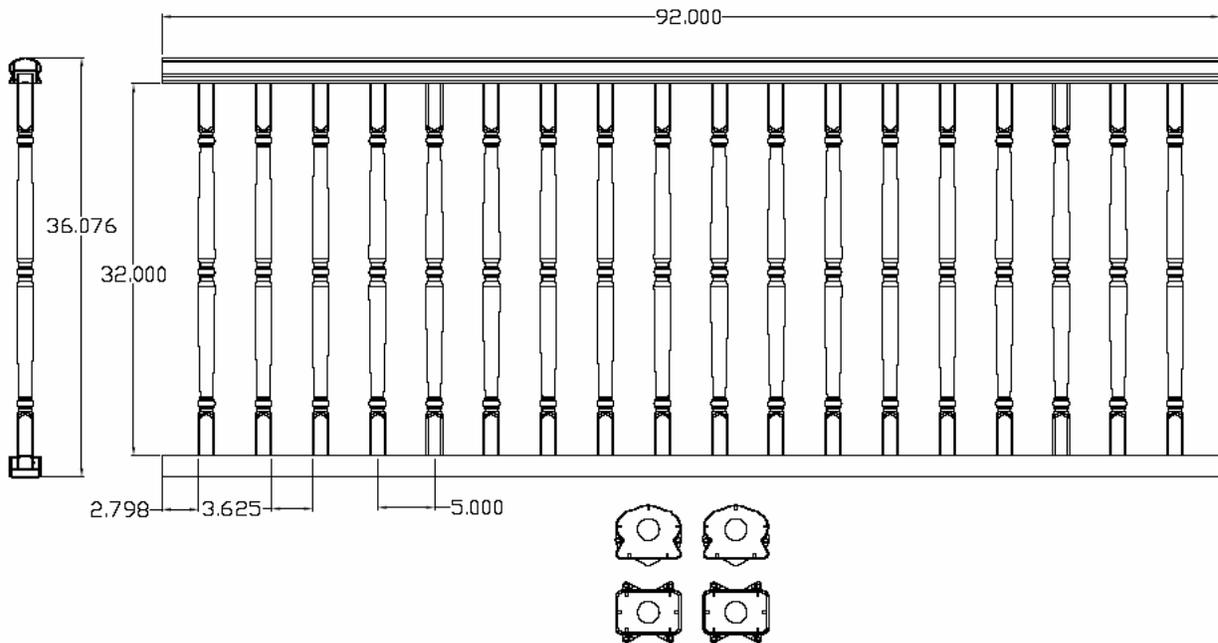


Figure 1 – Level Railing Assembly  
(Shown with spindles)

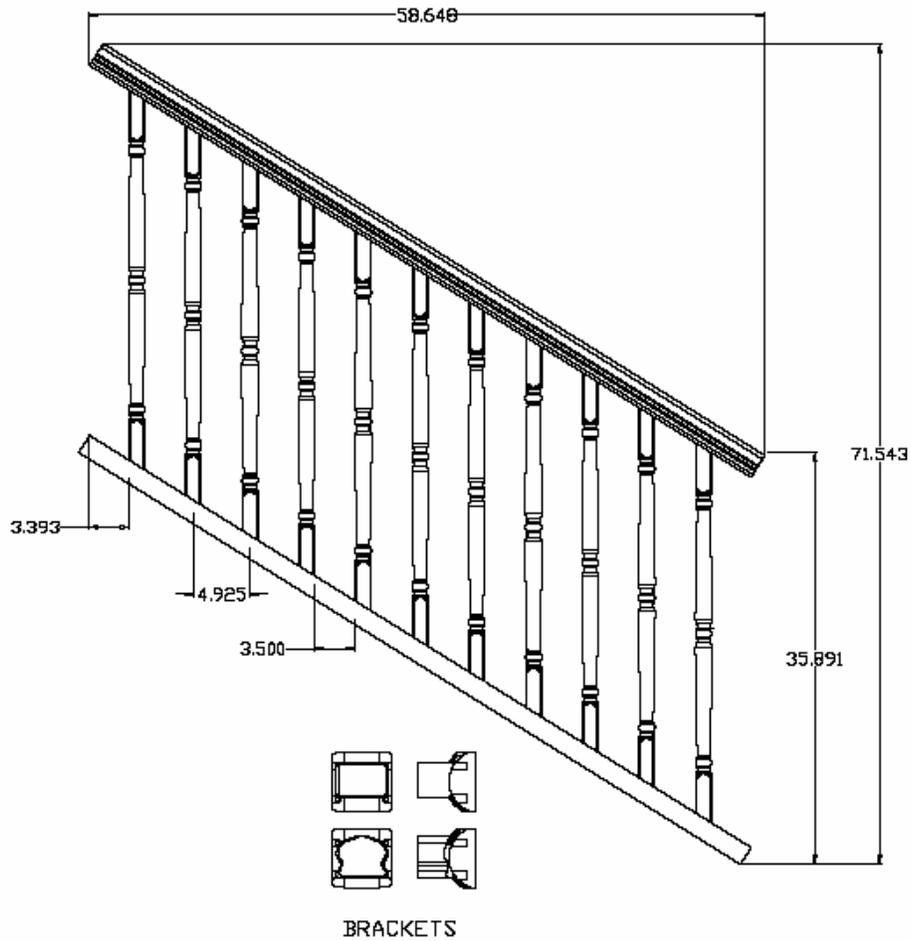


Figure 2 - Stair Railing Assembly (Shown with spindles)

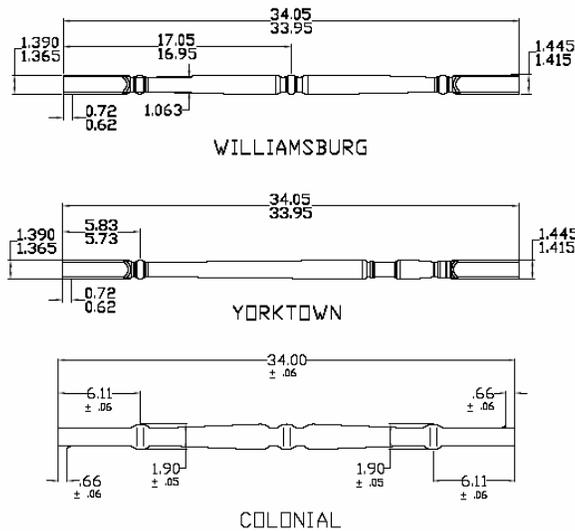


Figure 3 - Spindle Styles

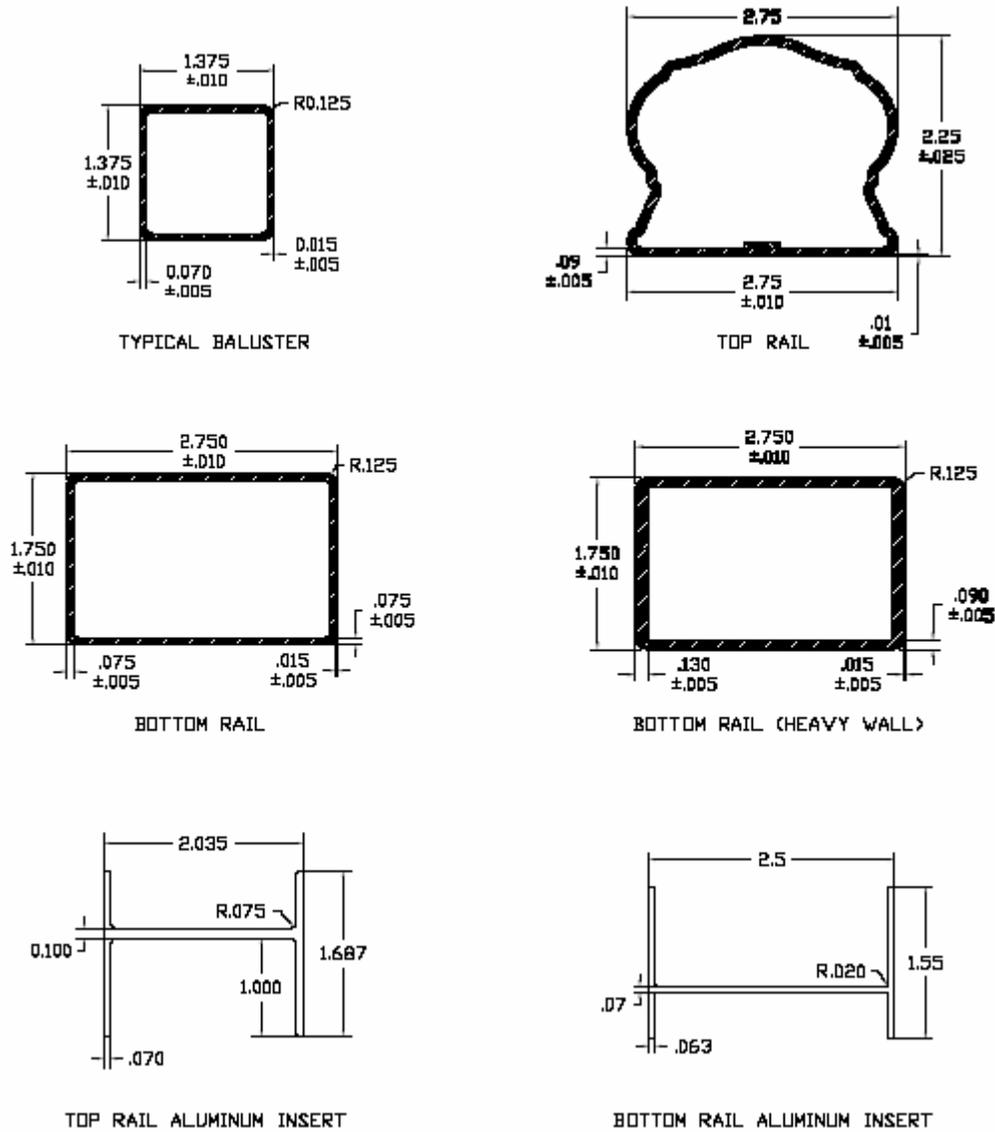


Figure 4 - Railing System Components