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DIVISION: 06 00 00 – WOOD, PLASTICS AND COMPOSITES
Section: 06 63 00 - Plastic Railings

REPORT HOLDER:

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REPORT SUBJECT:

Illusions™ Vinyl Railing System

1.0 SCOPE OF EVALUATION

1.1 This Research Report addresses compliance with the following Codes:

- 2018 and 2015 *International Building Code*® (IBC)
- 2018 and 2015 *International Residential Code*® (IRC)

NOTE: This report references 2018 Code sections with [2015] Code sections shown in brackets where they differ.

1.2 The *Illusions™ Vinyl Railing System* has been evaluated for the following properties (see Table 1):

- Structural performance
- Durability
- Surface Burning

1.3 The *Illusions™ Vinyl Railing System* has been evaluated for the following uses (see Table 1):

- The *Illusions™ Vinyl Railing System* is a guard or guardrail under the definitions of the referenced codes. It is intended for use at or near the open sides of elevated walking areas of buildings and walkways as required by the codes.
- Guardrail systems recognized in this report may be used in One- and Two-Family Dwellings regulated by the IRC and all construction types regulated by the IBC in accordance with IBC Section 705.2.3.1 [1406.3], Exception 2. See Table 1 for additional restrictions based upon Use and Occupancy Classification.

2.0 STATEMENT OF COMPLIANCE

The *Illusions™ Vinyl Railing System* complies with the Codes listed in Section 1.1, for the properties stated in Section 1.2 and uses stated in Section 1.3, when installed as described in this report, including the Conditions of Use stated in Section 6.0.

3.0 DESCRIPTION

3.1 Guards are provided as level guards for level walking areas such as decks, balconies and porches and sloped guards for open sides of stairways.

3.1.1 Level guards are provided with rail lengths up to 120 inches in length (measured between the inside of support posts) and an installed height of up to 42 inches. See Table 1.

3.1.2 Stair guards are provided with rail lengths up to 87.5 inches measured along the sloping length between the inside of supports and an installed height of up to 42 inches at the leading edge of the stair tread or landing. See Table 1.

3.2 The *Illusions™ Vinyl Railing System* is an assemblage of extruded and molded components utilizing Poly Vinyl Chloride (PVC) material and aluminum reinforcements. The PVC components are produced in three colors; White, Beige, and Gray.



3.3 The guard system includes a top rail with an aluminum reinforcing insert, a bottom rail, vertical balusters, non-structural 4 inch by 4 inch post sleeves, rail to post brackets, support block, decorative moldings, and post caps.

3.3.1 The top rail is a co-extruded PVC rail with either a "T" profile with overall sectional dimensions of 3.5 inches wide by 3.5 inches tall or a rectangular profile with overall sectional dimensions of 2 inches wide by 3.5 inches tall. Both top rails incorporate an extruded aluminum reinforcing insert. See Figures 1, 2, and 3.

3.3.2 The bottom rail is a co-extruded PVC rail with an overall sectional dimension of 2 inches wide by 3.5 inches tall. See Figure 3.

3.3.3 Balusters are provided in two styles: Traditional and Colonial.

3.3.3.1 Traditional balusters are co-extruded PVC with a 1.5 inches square sectional hollow profile.

3.3.3.2 Colonial balusters are a thermoformed PVC spindle with a 1.5 inches square-ended sectional hollow profile.

3.3.3.3 The balusters are secured to the top and bottom rail via insertion into the routed openings of the top and bottom rails.

3.3.3.4 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.

3.3.4 Top and bottom rails are attached directly to structural supports with Nylon mounting brackets. See Figure 4.

3.3.5 Structural supports may be conventional wood framing or a Steel Post Mount. See Figure 6. A 4 inch by 4 inch co-extruded PVC post sleeve is utilized with the Steel Post Mount support and may also be used to sleeve a conventional 4x4 wood post. See Figure 5.

3.3.6 Steel Post Mounts are comprised of a 2 inch square steel tube and welded 5/8 inch thick steel base plate for anchorage. A molded PVC spacer/mounting block provides for attachment of rail brackets. See Figure 6.

3.3.7 A support block is installed between the lower rail and the deck surface midway between supports.

4.0 PERFORMANCE CHARACTERISTICS

4.1 The guardrail system described in this report has 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 The PVC material used in the guardrail system has a flame spread index not exceeding 200 tested according to ASTM E 84.

5.0 INSTALLATION

5.1 The *Illusions™ Vinyl Railing System* must be installed in accordance with the manufacturer's published installation instructions, the applicable Code, and this Research Report. A copy of the manufacturer's instructions must be available on the jobsite during installation.

5.2 The baluster connections to the top and bottom rails are made by inserting the balusters into the routed openings in both rails.

5.3 The top and bottom rails are attached directly to structural supports utilizing Nylon mounting brackets. See Figure 4.

5.4 The top and bottom rails may be attached to either conventional wood supports or a 4 inch square PVC post sleeve and Steel Post Mount. See Figures 4 and 5. Conventional wood supports, including wood posts, are outside the scope of this report.

5.5 4x4 conventional wood posts may be covered by a 4 inch by 4 inch non-structural PVC post sleeve with decorative caps and moldings.



5.6 The wood in the supporting structure, including conventional posts, shall have a specific gravity of 0.50 (southern yellow pine) or greater.

5.7 The Steel Post Mount is attached to the supporting structure using four 3/8 inch anchoring bolts with flat washers. See Figure 6. The type and length of anchor bolts is dependent upon the material and condition of the supporting structure and is not within the scope of this report.

6.0 CONDITIONS OF USE

The guard 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:

6.1 Installation must comply with this Research Report, the manufacturer's published installation instructions, and the applicable Code. In the event of a conflict, this report governs.

6.2 Conventional wood supports 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. Where required by the building official, engineering calculations and details shall be provided.

6.3 Anchorage of the Steel Post Mount assemblies are not within the scope of this report and are subject to evaluation and approval by the building official. Anchors must satisfy the design load requirements specified in Chapter 16 of the building code and must meet the following minimum requirements:

6.3.1 A minimum of four anchor bolts must be used and located in the four pre-drilled holes in the post base plate.

6.3.2 The anchors must have a minimum nominal diameter equal to 3/8 inch.

6.3.3 When the supporting structure is a wood-framed deck, installation must include anchorage to suitable structural framing. Decking is not considered structural framing, and anchorage to decking alone is not an approved installation method.

6.3.4 Where required by the building official, engineering calculations and details shall be provided. The calculations shall verify that the anchorage complies with the building code for the type and condition of the supporting construction.

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

6.5 *Illusions™ Vinyl Railing System* is manufactured under a quality control program with inspections by Intertek Testing Services NA, Inc.

7.0 SUPPORTING EVIDENCE

7.1 Drawings and installation instructions submitted by the manufacturer.

7.2 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)*, revised December 2014 and ASTM D 7032-14 [10a], *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)*.

7.3 Documentation of an Intertek approved quality control system for the manufacturing of products recognized in this report.

8.0 IDENTIFICATION

The *Illusions™ Vinyl Railing System* is identified with the manufacturer's name (Eastern Wholesale Fence LLC) address and telephone number, the product name (*Illusions™ Vinyl Railing System*), the maximum span between posts and for applicable rails, the statement "For Use in One-and Two-Family Dwellings Only," the Intertek Mark as shown below, and the Code Compliance Research Report number (CCRR-0143).





9.0 OTHER CODES

This section is not applicable.

10.0 CODE COMPLIANCE RESEARCH REPORT USE

10.1 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.

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

10.3 Reference to the <https://bpdirectory.intertek.com> is recommended to ascertain the current version and status of this report

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TABLE 1 - GUARDRAIL SPANS AND CODE OCCUPANCY CLASSIFICATIONS

| Type | Dimensions | Baluster Style | Top Rail | Post | Connection Fastening Schedule | | | Code Occupancy Classification |
|----------------------|---------------------------|-------------------------|----------------------------|------------------------------|---|--|--|---|
| | | | | | Top and Bottom Rail Bracket to Post | Top Rail Bracket to Rail | Bottom Rail Bracket to Rail | |
| Level ⁽¹⁾ | >8 ft. to 10 ft. by 42 in | Traditional | T-Rail | PVC-Sleeved Steel Post Mount | Four #10 x 1" self-tapping, pan head screws | Four #10 x 3/4" self-tapping pan head screws | Two #10 x 3/4" self-tapping, pan head screws | IBC / All Use Group Classifications and IRC |
| | | | | PVC-Sleeved Wood Post | Four #10 x 1-1/2" self-tapping, pan head screws | Six #10 x 3/4" self-tapping pan head screws | | |
| Level ⁽¹⁾ | up to 8 ft. by 42 in | Colonial or Traditional | T-Rail or Rectangular Rail | PVC-Sleeved Steel Post Mount | Four #10 x 1" self-tapping, pan head screws | Two #10 x 3/4" self-tapping pan head screws | Two #10 x 3/4" self-tapping, pan head screws | |
| | | | | PVC-Sleeved Wood Post | Four #10 x 1-1/2" self-tapping, pan head screws | | | |
| Stair ⁽²⁾ | up to 87.5 in by 42 in | Colonial or Traditional | T-Rail or Rectangular Rail | PVC-Sleeved Steel Post Mount | Four #10 x 1" self-tapping, pan head screws | Two #10 x 3/4" self-tapping pan head screws | Two #10 x 3/4" self-tapping, pan head screws | |
| | | | | PVC-Sleeved Wood Post | Four #10 x 1-1/2" self-tapping, pan head screws | | | |
| Level ⁽¹⁾ | >8 ft. to 10 ft. by 42 in | Colonial or Traditional | Rectangular Rail | PVC-Sleeved Steel Post Mount | Four #10 x 1" self-tapping, pan head screws | Two #10 x 3/4" self-tapping pan head screws | Two #10 x 3/4" self-tapping, pan head screws | |
| | | | | PVC-Sleeved Wood Post | Four #10 x 1-1/2" self-tapping, pan head screws | | | |
| | | Colonial | T-Rail | PVC-Sleeved Steel Post Mount | Four #10 x 1" self-tapping, pan head screws | Two #10 x 3/4" self-tapping pan head screws | Two #10 x 3/4" self-tapping, pan head screws | |
| | | | | PVC-Sleeved Wood Post | Four #10 x 1-1/2" self-tapping, pan head screws | | | |

⁽¹⁾ Length is clear space between supports.

⁽²⁾ Length is sloping distance of rail between supports.

⁽³⁾ The use of this product shall be limited to exterior use as a guard system for balconies and porches for one- and two-family dwellings of Type V-B (IBC) construction and structures constructed in accordance with the IRC.



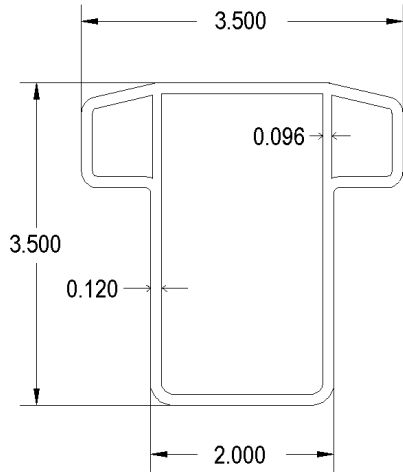


FIGURE 1
TOP RAIL PROFILE

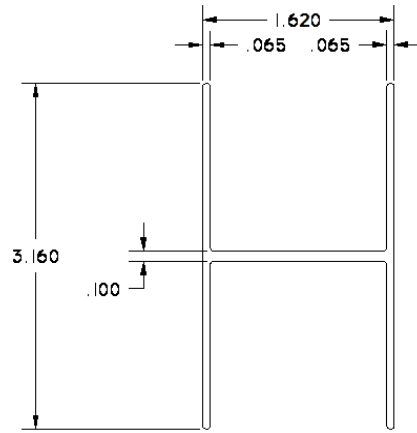


FIGURE 2
TOP RAIL INSERT

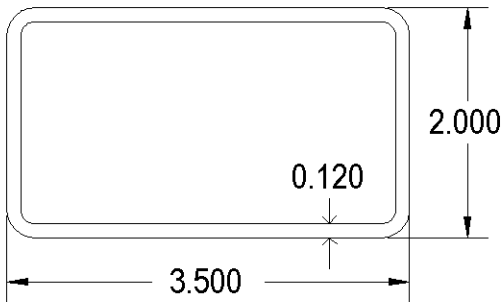


FIGURE 3
TOP AND BOTTOM RAIL
T-RAIL BOTTOM RAIL PROFILE

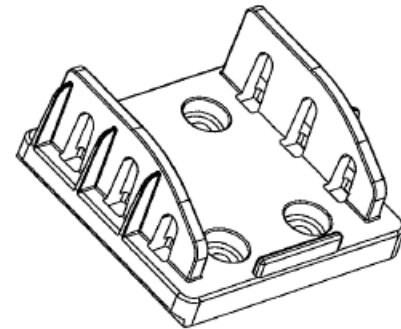


FIGURE 4
RAIL BRACKET

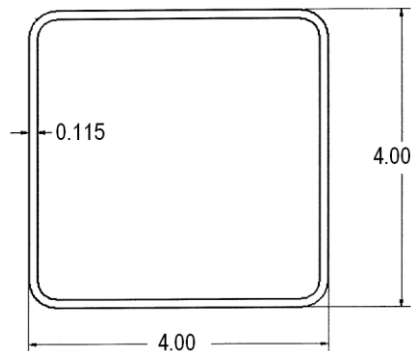


FIGURE 5
PVC POST SLEEVE

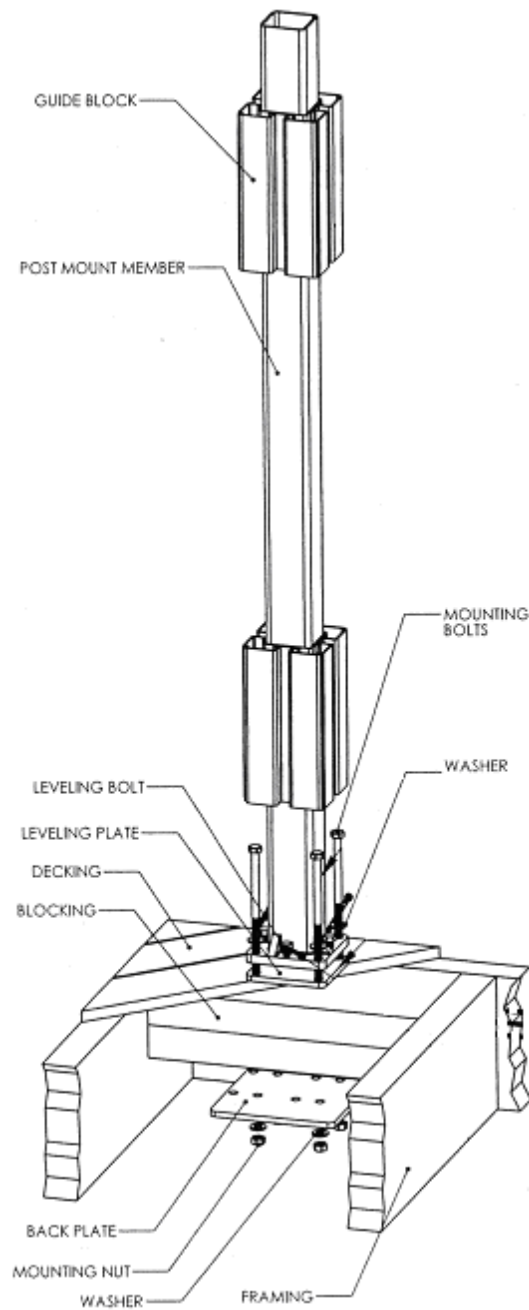


FIGURE 6
STEEL POST MOUNT

Note: Supporting structure (wood deck) is not within the scope of this report and must be designed and constructed in accordance with Chapter 16 of the IBC.