1.0 Subject

PolyRAIL Systems TRX Vinyl Guardrail System

2.0 Research Scope

2.1. Building Codes:
- 2012 International Building Code (IBC)
- 2012 International Residential Code (IRC)
- 2010 Florida Building Code (FBC) - Excluding High-Velocity Hurricane Zones

2.2. Properties:
- Structural Performance
- Durability
- Surface Burning
- Decay Resistance
- Termite Resistance

3.0 Description

3.1. General – The TRX 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 aluminum inserts, 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 extruded Polyvinyl Chloride (PVC) produced in a single color; White.

3.4. All top rails are provided with an aluminum insert with a 'T' profile. All bottom rails are provided with an aluminum insert with a 'U' profile. All rail inserts are extrusions of 6063-T6 aluminum. See Figure 2.

3.5. Level guards with heights of up to 42 inches above the floor surface are provided in lengths up to 8 feet as measured from inside-to-inside of supports.

3.6. The top assembly consists of one rail, and is attached to each support with a single PVC bracket. The top rail is a 'T' profile and is 1.75 inches high by 3.25 inches wide See Figure 1.

3.7. The bottom assembly consists of one rail, and is attached to each support with a single PVC bracket. The bottom rail is 1.75 inches square. See Figure 1.

3.8. Balusters are extruded PVC and are 1.375 inches square. 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.

3.9. 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.

3.10. Post sleeves are 4 inches square and have a wall thickness of 0.16 inch.

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 & FBC and Section R301 of the IRC & FRC 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 not exceeding 200 when tested according to 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 Figure 3.

5.3. One mounting bracket attaches to each end of the upper rail using two (2) #8 by 0.75 inch, self-drilling, pan-head screws. The brackets are attached to the supports using two (2) #12 by 1.25 inch, thread-cutting, Type 17, pan-head screws.

5.4. One mounting bracket attaches to each end of the lower rail using two (2) #8 by 0.75 inch, self-drilling, pan-head screws. The brackets are attached to the supports using four (4) #12 by 1.25 inch, thread-cutting, Type 17, pan-head screws.

5.5. Foot blocks are intermediate bottom rail supports and are installed between the deck surface and the rail at the mid-point of the rail and consist of a 2.0 inch section of baluster and a 1.312 inch by 0.625 inch HDPE block. The HDPE block is attached to the bottom rail utilizing two (2) #12 by 1.25 inch thread cutting screws. The baluster section is attached to the HDPE block utilizing two (2) #8 by 0.75 inch self-drilling screws.

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 January 2012.

6.3. The reports of testing and engineering analysis demonstrating compliance with the performance requirements ASTM D 7032-08, Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails).


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 & FBC or IRC & FRC are limited to exterior use in all construction types where wood is permitted in accordance with Section 1406.3 of the IBC & FBC and in One and Two Family Dwellings regulated by the IRC & FRC.

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 & FBC and Section R301 of the IRC & FRC 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. Skewed mounting bracket connections to supports are not within the scope of this report and are subject to evaluation and approval by the building official.

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

7.5. All products are manufactured in Bremen, Indiana by Digger Specialties, Inc. in accordance with the manufacturer's approved quality control system with inspections by NTA, Inc. (AA-682).
8.0 Identification

The composite guard assemblies produced by Digger Specialties, Inc. 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 and the manufacturers address

8.2. The identifying mark and/or name of the independent inspection agency, NTA (AA-682)

8.3. The Architectural Testing registered mark and CCRR number (CCRR-0147).

8.4. The statement “See ATI CCRR-0147 at www.ati-es.com for uses and performance levels.”

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 – Guardrail System and Use Categories

<table>
<thead>
<tr>
<th>Name</th>
<th>Guardrail Type</th>
<th>Code Occupancy Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>PolyRAIL Systems TRX</td>
<td>Level</td>
<td>IBC: 8’ x 42”</td>
</tr>
<tr>
<td>Vinyl Guardrail System</td>
<td></td>
<td>ALL USE GROUPS</td>
</tr>
</tbody>
</table>

1 Guardrails are qualified up to and including the listed maximum guardrail system dimensions for use in the referenced Code Occupancy Classification.

2 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, FBC) construction in accordance with the IRC or FBC-Residential.

3 Excluding wind-borne-debris regions

4 Excluding High-Velocity-Hurricane-Zone (HVHZ)
Figure 1 – Rail Profiles

Figure 2 - Aluminum Rail Inserts

Figure 3 – Mounting Brackets