



Code Compliance Research Report

CCRR-0132

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1.0 Subject

Guardrail Systems

Transcend® Series Railing System

Trex® Select® Series Railing System

2.0 Research Scope

2.1. Building Codes:

2009 International Building Code (IBC)

2009 International Residential Code (IRC)

2.2. Properties:

Structural Performance

Durability

Surface Burning

Decay Resistance

Termite Resistance

3.0 Description

3.1. General – The Trex® *Transcend® Series* and *Select® Series* railing systems 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. Railing systems include a top and bottom rail, baluster spacers, vertical balusters, post sleeves, rail-to-post brackets, foot blocks and decorative moldings. See Table 1 for recognized railing dimensions.

3.3. All rails (top and bottom), baluster spacers, balusters, post sleeves, foot blocks and decorative moldings are extrusions of a wood-plastic composite core material, with a PVC or Acrylic cap layer.

3.4. The Trex® *Transcend® Series* railing system is produced in White, Black, Fire Pit, Gravel Path, Rope Swing, Tree House, and Vintage Lantern, consisting of the following components:

3.4.1. Top rail is the crown rail profile, with overall dimensions of 2.75 inches wide by 2 inches tall. See Figure 2.

3.4.2. Bottom rail is the universal rail profile, with overall dimensions of 3.125 inches wide by 2.25 inches tall. See Figure 2.

3.4.3. Baluster is a 1.375 inch square profile. See Figure 3. A baluster spacer is installed onto the top and bottom rails. The balusters are placed through these spacers at each end to provide a means for securing the balusters to the rails. See Figure 4.

3.4.4. Rails are attached to posts with nylon composite brackets. See Figure 5.

3.4.5. Post sleeve is a 4.45 inch square profile with three ribs on each side. See Figure 6.

3.5. The Trex® *Select® Series* railing system is produced in White, consisting of the following components:

3.5.1. Top and bottom rails are a rectangular rail profile, with overall dimensions of 2.75 inches wide by 2 inches tall. Top rails are oriented horizontally, and bottom rails are oriented vertically. See Figure 8.

3.5.2. Baluster is a 1.125 inch square profile. See Figure 9.

3.5.3. Rails are attached to posts with nylon brackets. See Figure 10.

3.5.4. Post sleeve is a 4.45 inch square profile with three ribs on each side. See Figure 6.

4.0 Performance Characteristics

4.1. The guard 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 and ASTM D 7032.

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. See Section 7.5 for limitations.

4.4. The materials used for the Trex® railing systems have a flame spread index less than 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. Trex® *Transcend® Series* Railing System (See Figure 1)

5.2.1. The top and bottom rail assemblies are attached to conventional 4x4 wood posts, sleeved with a 4.45" by 4.45" composite post cover, with a mounting bracket. See Figure 5.

5.2.2. One mounting bracket attaches to each end of the upper and lower rails utilizing two #12 x 1.5" self-drilling screws. The brackets are attached to the post utilizing two #8 x 2" wood screws. See Table 2.

5.2.3. Baluster spacers are installed along the lengths of the upper and lower rail and are secured by a friction fit into the top and bottom rails.

5.2.4. Foot blocks are an adjustable support and shall be installed at mid-span of the bottom rail between the deck surface and the rail using one #10 x 2" deck screw. Alternatively, a section of 1.375" baluster approximately 4" long may be used and secured using construction adhesive.

5.3. Trex® *Select® Series* Railing System (See Figure 7)

5.3.1. The top and bottom rails are attached to conventional 4x4 wood posts sleeved with a 4.45" by 4.45" composite post cover with a mounting bracket. See Figure 10.

5.3.2. Mounting brackets are attached to each end of the top and bottom rails utilizing four #10 x 1" pan-head, self-drilling, stainless steel screws. The brackets are attached to the post utilizing four #8 x 2" flat-head wood screws. See Table 2.

5.3.3. Baluster connections to the top and bottom rails are made by inserting the balusters into the routed openings in both rails.

5.4. The wood in the supporting structure including support posts shall have a specific gravity of 0.55 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), approved January 2012.

6.3. The reports of testing and engineering analysis demonstrating compliance with the performance requirements of ASTM D 7032-07.

6.4. A quality control manual that is in accordance with the ICC-ES AC10, Acceptance Criteria for Quality Documentation, dated January 2014.

7.0 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.

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. Where required by the building official, engineering calculations and details shall be provided.

7.3. Only those types of fasteners and fastening methods described in this report have been evaluated for the installation of the products listed in Section 1.0; other methods of attachment are outside the scope of this report.

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. The wood-plastic composite material used for the Trex® railing systems have not been evaluated for use in areas subject to Formosan termite attack.

7.6. Trex® Company, Inc. Railing Systems are manufactured in Winchester, Virginia in accordance with the manufacturer's approved quality control system with inspections by PFS Corporation (AA-652).

8.0 Identification

The composite guard assemblies produced by Trex® Company, 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 of the independent inspection agency, (PFS)

8.3. The following statement, "See CCRR-0132 at www.ati-es.com for uses and performance levels." For railing systems limited to IRC in Table 1, the label shall also include the phrase, "For Use in One- and Two-Family Dwellings Only."

8.4. The Architectural Testing Code Compliance Research Report mark and number (CCRR-0132).

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 – Railing System Building Code Recognition

Railing System	Type of System	Guard System Size (Length x Height) ⁽¹⁾	Code Recognition
Trex® <i>Transcend</i> ® Series	Level Systems	67.5" by 42"	IBC – All Use Groups and IRC
Trex® <i>Select</i> ® Series	Level Systems	68.25" by 36"	IRC ⁽²⁾

¹ Level railing lengths are maximum clear length between supports. Railing height is the minimum installed height from walking surface to top of top rail.

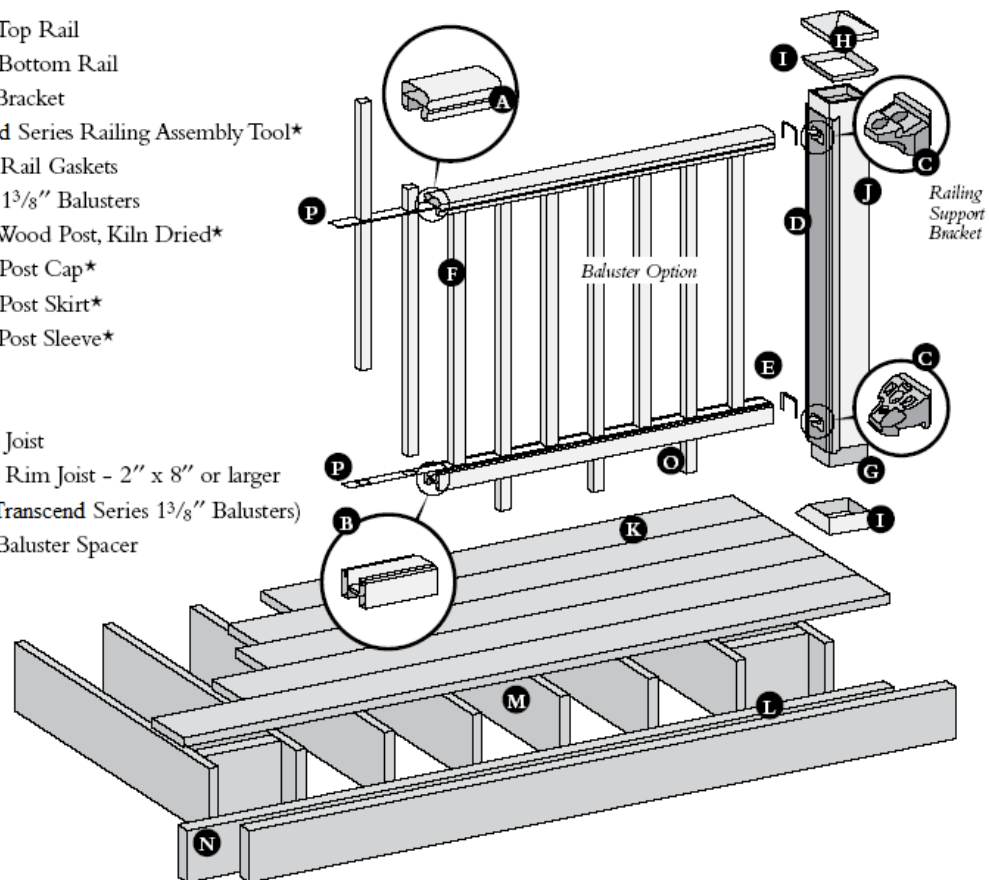
² Limited to exterior use as a guard system for balconies and porches for One- and Two-Family Dwellings of Type V-B (IBC) construction and structures constructed in accordance with the IRC.

Table 2 – Rail/Bracket Fastening Schedule

Railing System	Connection	Fastener
Trex® <i>Transcend</i> ® Series	Rail Bracket to Post	One nylon composite bracket is attached to the post using two #8 x 2" wood screws.
	Rail Bracket to Rail	One nylon composite bracket is attached to the rail using two #12 x 1.5" self-drilling screws.
	Foot Block to Bottom Rail	One #10 x 2" deck screw
Trex® <i>Select</i> ® Series	Rail Bracket to Post	One nylon bracket is attached to the rail using four #8 x 2 inch flat-head wood screws.
	Rail Bracket to Rail	Four #10 x 1 inch pan-head, self-drilling, stainless steel screws (two on each side of the bracket)



- A. Trex Transcend Series Top Rail
- B. Trex Transcend Series Bottom Rail
- C. Trex Railing Support Bracket
- D. TrexExpress™ Transcend Series Railing Assembly Tool*
- E. Trex Transcend Series Rail Gaskets
- F. Trex Transcend Series 1³/₈" Balusters
- G. 4 x 4 Pressure Treated Wood Post, Kiln Dried*
- H. Trex Transcend Series Post Cap*
- I. Trex Transcend Series Post Skirt*
- J. Trex Transcend Series Post Sleeve*
- K. Trex® Decking
- L. Trex Trim
- M. Code-Approved Wood Joist
- N. Code-Approved Wood Rim Joist - 2" x 8" or larger
- O. Support Blocks (Trex Transcend Series 1³/₈" Balusters)
- P. Trex Transcend Series Baluster Spacer



*Item not included in the *Transcend Series Railing™ kits*

Figure 1 – Trex® Transcend® Series Railing - Rail Assembly

Note: Supporting structure including deck framing, decking and 4x4 conventional wood posts are not within the scope of this report.



Figure 2 – Trex® Transcend® Series Railing - Rail Profiles



Figure 3 – Trex® Transcend® Series Railing - Baluster Profile

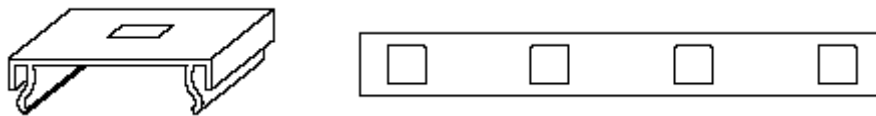


Figure 4 – Trex® Transcend® Series Railing - Baluster Spacer

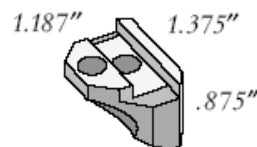


Figure 5 – Trex® Transcend® Series Railing - Rail Bracket

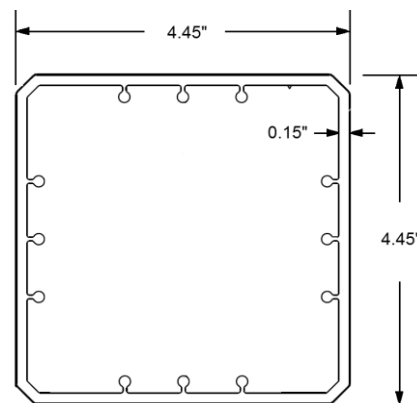


Figure 6 – Trex® Transcend® Series and Select® Series Railing - Post Sleeve Profile

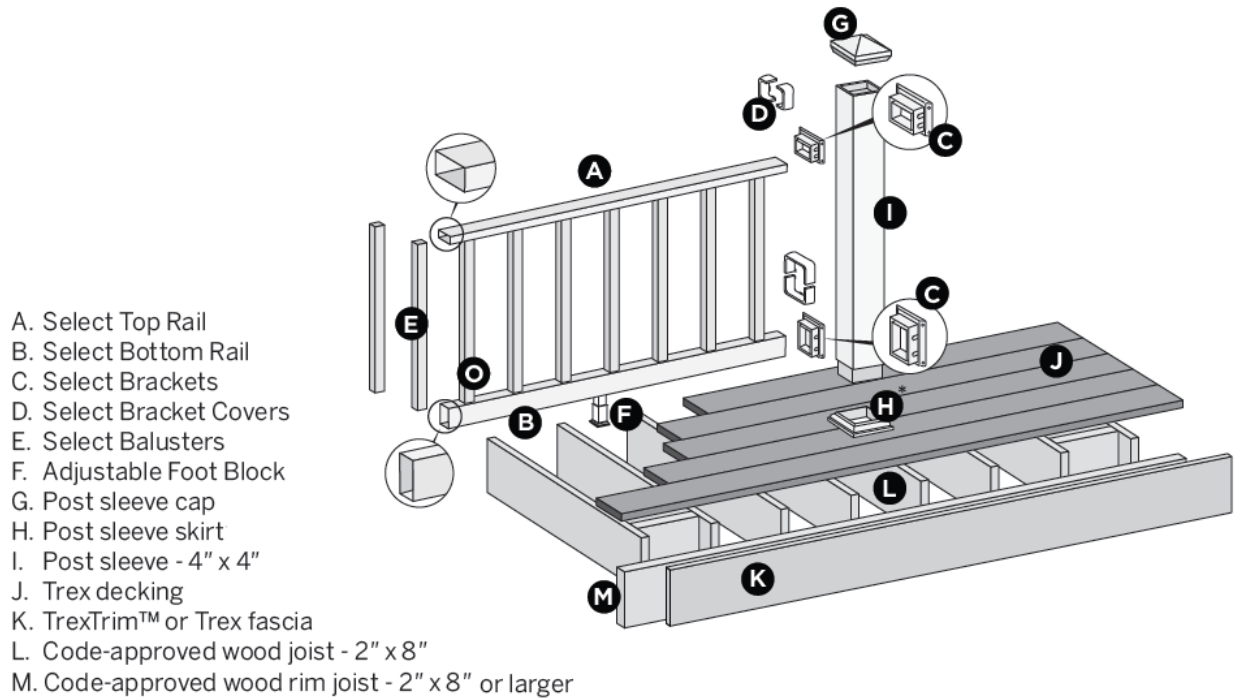


Figure 7 – Trex® Select® Series Railing - Rail Assembly

Note: Supporting structure including deck framing, decking and 4x4 conventional wood posts are not within the scope of this report.

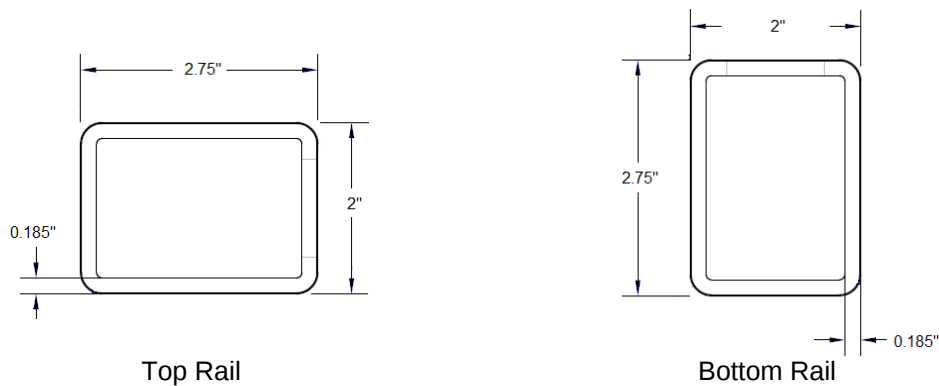


Figure 8 – Trex® Select® Series Railing - Rail Profiles

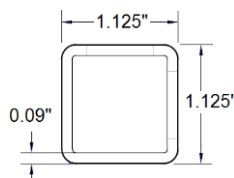


Figure 9 – Trex® Select® Series Railing - Baluster Profile

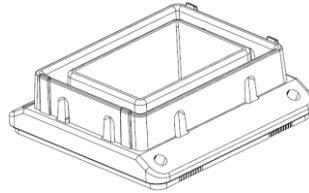


Figure 10 – Trex® Select® Series Railing - Rail Bracket