



Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

Report No: 2307-03



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Trex® Company – Trex Signature® Railing Systems

Trade Secret Report Holder:

Trex® Company

Phone: 800-289-8739 Website: www.trex.com

CSI Designations:

DIVISION: 05 00 00 - METALS

Section: 05 52 00 - Metal Railings

Section: 05 52 23 - Aluminum Railings

Section: 05 73 00 - Decorative Metal Railings

Section: 05 73 13 - Glazed Decorative Metal Railing Section: 05 73 15 - Tempered Glass Railing Assemblies

1 Innovative Products Evaluated 1

- 1.1 Trex Signature Railing Systems:
 - 1.1.1 Trex Signature Aluminum Railing
 - 1.1.2 Trex Signature Rod Rail
 - 1.1.3 Trex Signature Mesh Railing
 - 1.1.4 Trex Signature Glass Railing
- 1.2 Trex Posts:
 - 1.2.1 Trex Signature Post
 - 1.2.2 Trex Crossover Post
 - 1.2.3 Trex Select® Aluminum Post

2 Product Description and Materials

- 2.1 Trex Signature Railing Systems are guardrail systems comprised of extruded aluminum components, stainless steel fasteners, and various in-fill options. The railing infill systems can be installed using approved aluminum posts. See **Table 1** for details on the railing infill systems and **Table 2** for post specifications.
 - 2.1.1 Extruded aluminum components are available in the following powder coats: Classic White, Bronze, Charcoal Black, and Platinum (rods only).
 - 2.1.2 In-fill options include: balusters, horizontal rods, stainless steel mesh, and tempered glass panel.
 - 2.1.3 Additional details regarding the evaluated Trex Signature Railing Systems are shown in **Table 1**, with component profile details shown in **Figure 5** through **Figure 9**.









2.2 The innovative products evaluated in this report are shown in **Figure 1** through **Figure 4**.

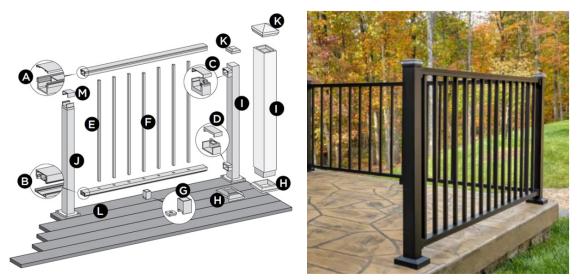


Figure 1. Trex Signature Aluminum Railing



Figure 2. Trex Signature Rod Rail









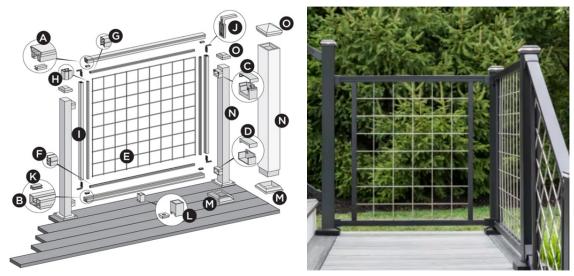


Figure 3. Trex Signature Mesh Railing

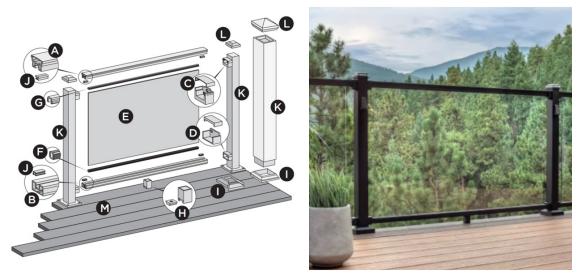


Figure 4. Trex Signature Glass Railing









Table 1. Product Information

Product	Description	Maximum Allowable	Railing Assembly	Railing Assembly		Railing Assembly Total Dimensions		Application
	·	Dimensions	Infill	Heights	Lengths			
Signature Railing		42" Height	3/4" Square or Round Vertical Aluminum Balusters	20" 40"	48", ¹ 72" and 96"	Horizontal		
Signature Mesh Railing	Aluminum	and 96" Span Between Posts	Stainless Steel Mesh		72" and 96"			
Signature Rod Rail	Railing Assembly		1/2" Round Horizontal Aluminum Rods	36" and 42"	72" and 96"	Horizontal		
Signature Glass Railing		42" Height and 72" Span Between Posts	1/4" Thick Tempered Glass		72"			

SI: 1 in = 25.4 mm

2.3 Additional details regarding the components of Trex Signature Railing Systems are provided in **Table 2** through **Table 5**.

Table 2. Approved Posts for Use with Trex Signature Railing Systems

Product	Approved Railing System	Maximum Railing Height	Post Cross-Section Dimensions	Base Plate Dimensions	Maximum Allowable Post Spacing
Trex Signature Post	Signature Railing,	42" Height	2.5" x 2.5" x 0.13"	4.0" x 4.0" x 0.50"	- 96" Between Posts
Trex Select Aluminum Post	Signature Mesh Railing, Signature Rod Rail		2.5" x 2.5" x 0.085"	4.0" x 4.0" x 0.35"	
Trex Signature Post	Cianatura Clasa Dailina	400.11	2.5" x 2.5" x 0.13"	4.0" x 4.0" x 0.50"	70! Datus an Dasta
Trex Select Aluminum Post	Signature Glass Railing	42" Height	2.5" x 2.5" x 0.085"	4.0" x 4.0" x 0.35"	72" Between Posts
SI: 1 in = 25.4 mm					

^{1.} Only available as a preassembled option.

^{2.} Widths are based on the maximum allowable span between posts.









Table 3. Component Details of Trex Signature Railing Systems

Component	Description
Top Rail	1¹/₂" high by 1³/₄" wide (overall dimensions) two-piece component consisting of ³/₅" high by 1³/₄" wide by 0.11" wall 6063-T6 extruded aluminum Top Rail Cover and ¹⁵/₁₅" high by 19/₁₅" wide by 0.11" wall, 6105-T5 extruded aluminum Top Rail. Square or Round holes are machined into the Top Rails to define the spacing for the vertical balusters.
	Insert: 15/16" high x 11/8" wide x 0.06" thick walled Inverted U-shaped ridged PVC baluster retainer
Bottom Rail	1¹/₄" high by 1³/₄" wide (overall dimensions) two-piece component consisting of 1³/₁₆" high by 1³/₄" wide by 0.10" wall 6063-T6 extruded aluminum Bottom Rail Cover and 5/₁₆" high by 1³/₄" wide by 0.06" wall, 6063-T6 extruded aluminum Bottom Rail. Square or Round holes are machined into the Bottom Rails to define the spacing for the vertical balusters.
	Insert: 15/16" high x 11/8" wide x 0.06" thick walled Inverted U-shaped ridged PVC baluster retainer
Foot Block	13/8" square by 2" long by 0.13" wall 6063-T52 extruded aluminum. A 1/2" high by 11/16" wide by 11/4" long 6063-T6 aluminum T-shaped member is located at the mid-span of the guardrail.
Dail Praekete	Top Rail: 11/8" high x 13/4" wide x 13/16" deep Zamak 3 Zinc collar bracket
Rail Brackets	Bottom Rail: 13/8" high x 2" wide x 13/16" deep Zamak 3 Zinc collar bracket
Baluster	Square – 3/4" square by 0.04" wall 6063-T6 extruded aluminum
DaiuStei	Round – 3/4" O.D. by 0.06" wall 6063-T6 extruded aluminum

Table 4. Component Details of Trex Signature Rod Rail Systems

Component	Description	
Top Rail	$1^{1}/_{2}$ " high by $1^{3}/_{4}$ " wide (overall dimensions) two-piece component consisting of $^{3}/_{8}$ " high by $1^{3}/_{4}$ " wide by 0.11" wall 6063-T6 extruded aluminum Top Rail Cover, and $1^{5}/_{16}$ " high by $1^{9}/_{16}$ " wide by 0.11" wall, 6105-T5 extruded aluminum Top Rail. The two pieces include the Top Rail Cover and the Top Rail.	
Bottom Rail	1¹/₄" high by 1³/₄" wide (overall dimensions) two-piece component consisting of 1³/₁6" high by 1³/₄" wide by 0.10" wall 6063-T6 extruded aluminum top section and 5/₁6" high by 1³/₄" wide by 0.06" wall, 6063-T6 extruded aluminum Bottom Rail. The two pieces include the Bottom Rail Cover and the Bottom Rail.	
Supports	Intermediate: and Vertical: 1" x 1.25" rectangular 6063-T6 extruded aluminum vertical supports with machined holes to define the spacing for the horizontal round baluster rods.	
Top Rail Stiffener	11/4" wide by 0.13" thick 6061-T6 aluminum plate (Stiffener required for spans greater than 72")	
Foot Block	13/8" square by 2" long by 0.13" wall 6063-T52 extruded aluminum (one located at midspan). (Foot block required for all spans greater than 72")	
Dail Attachment	Standard – Cast aluminum saddle brackets (top and bottom rail).	
Rail Attachment	Crossover – 21/2" square x 9/16" thick cast aluminum post mount cap plate with two 11/16" high flanges (top rail only).	
Rod	1/2" O.D. solid wall 6105-T5 extruded aluminum horizontal rods	









Table 5. Component Details of Trex Signature Mesh and Glass Railing Systems

Component	Description		
Top Rail	17/ ₁₆ " high by 1 ³ / ₄ " wide by 0.09" wall 6063-T6 extruded aluminum		
Bottom Rail	11/4" high by 13/4" wide by 0.09" wall 6063-T6 extruded aluminum		
	Trex Signature Mesh Railing	0.62" high by 0.55" wide by 0.03" wall PVC "U"-Channel with internal longitudinal ribs running entire length	
Top/Bottom Rail and Support Baluster Insert	Tray Cignatura Class Bailing	0.51" high by 0.57" wide by 0.09" wall EPDM "U"-Channel with external longitudinal ribs running entire length (top rail)	
	Trex Signature Glass Railing	0.70" high by 0.57" wide by 0.09" wall EPDM "U"-Channel with external longitudinal ribs running entire length (bottom rail)	
Bottom Rail Support Block	13/8" square by 2" long by 0.13" wall 6063-T52 extruded aluminum (one located at midspan)		
	Trex Signature Mesh Railing	Vertical Support – 1" wide by 11/4" deep by 0.08/0.09" wall 6063-T6 extruded aluminum (two per guardrail, one located on either side of the mesh infill)	
Infill		Mesh Infill $-$ 96" wide by $38^{1}/_{2}$ " high by 0.19" diameter 316 stainless steel mesh infill, 4" square center-to-center spacing throughout center and 4" wide by 3" tall center-to-center spacing on top and bottom	
	Trex Signature Glass Railing	Glass Infill – 64" long by 385/ ₁₆ " high by ¹/₄" thick tempered monolithic glass	
	Standard – Cast zinc saddle brackets (top and bottom rail)		
Rail Attachment	Crossover – 21/2" square by 9/16" thick cast zinc post mount cap plate with two 11/16" high flanges (top rail only)		
	Support Baluster to Top/Bottom Rail – Plastic angle connector		

Table 6. Details of Posts used with Trex Signature Railing Systems

Component	onent Description	
Trex Signature Post or Crossover Post		
Post	2.5" x 2.5" x 0.13" 6063-T6 extruded aluminum	
Base Plate 4" x 4" x 0.5" 6063-T6 aluminum base plate with four 3/8" diameter holes located approximately 3/8" on-center each edge and approximately 3/8" on-center form each edge, and one 3/8" diameter hole located in the center		
Trex Select Aluminum Post		
Post	2.5" x 2.5" x 0.085" 6036-T6 aluminum tube	
Base Plate	4" x 4" x 0.38" 6036-T6 aluminum base plate with four 0.5" diameter holes located with centers located approximately 0.625" from each edge and approximately 3.25" apart on-center	









2.3.1 Trex Signature Railing Systems component profiles are shown in Figure 5 through Figure 9.

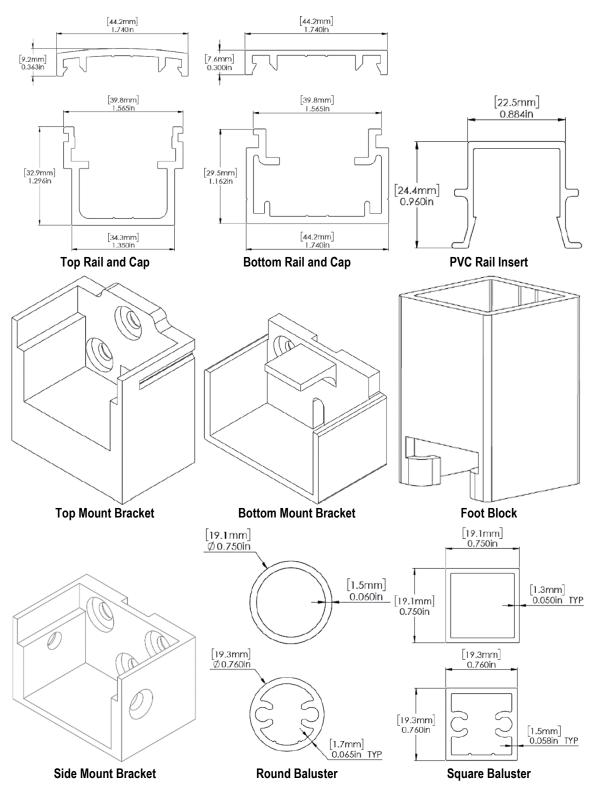


Figure 5. Trex Signature Aluminum Railing Components









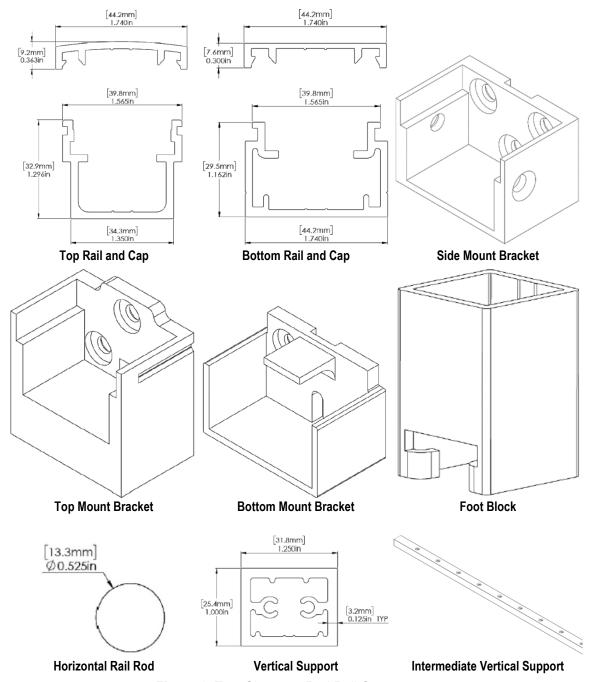


Figure 6. Trex Signature Rod Rail Components





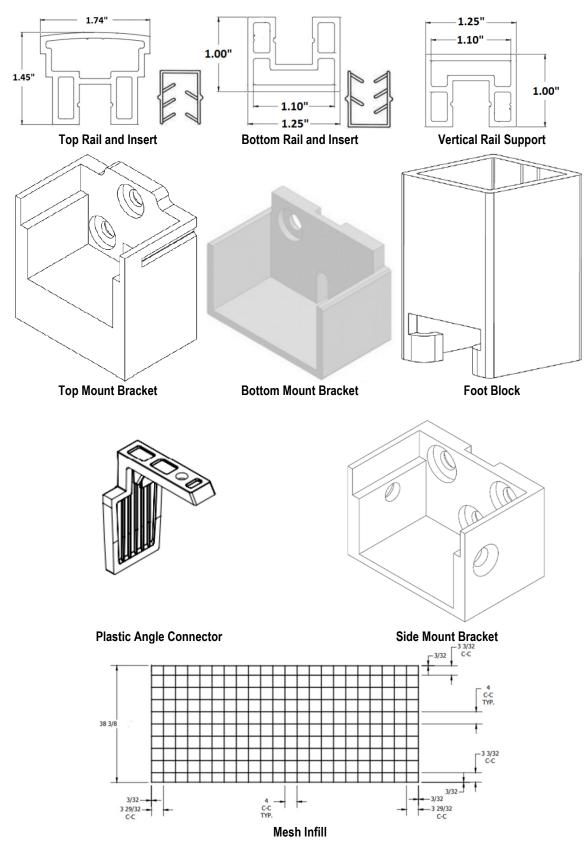


Figure 7. Trex Signature Mesh Railing Components









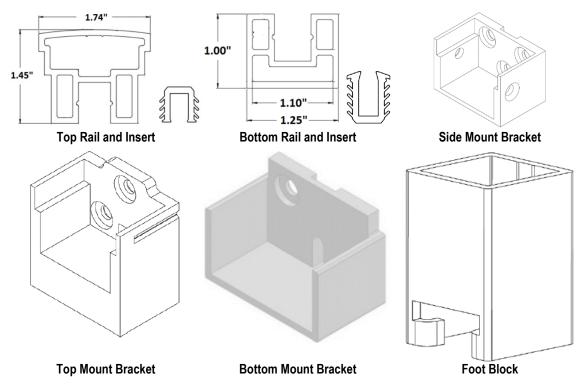


Figure 8. Trex Signature Glass Railing Components

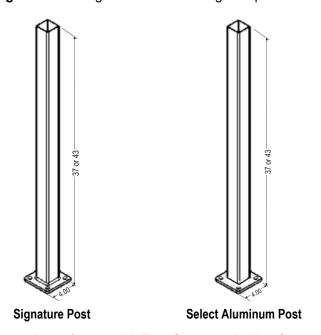


Figure 9. Posts for use with Trex Signature Railing System

2.4 As needed, review material properties for design in **Section 6** and the regulatory evaluation in **Section 8**.









3 Definitions²

- 3.1 New Materials³ are defined as building materials, equipment, appliances, systems, or methods of construction, not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.⁴ The design strength and permissible stresses shall be established by tests⁵ and/or engineering analysis.⁶
- 3.2 <u>Duly authenticated reports</u>⁷ and <u>research reports</u>⁸ are test reports and related engineering evaluations that are written by an approved agency⁹ and/or an approved source.¹⁰
 - 3.2.1 These reports utilize intellectual property and/or trade secrets to create public domain material properties for commercial end-use.
 - 3.2.1.1 This report protects confidential Intellectual Property and trade secretes under the regulation, 18.US.Code.90, also known as Defend Trade Secrets Act of 2016 (DTSA).¹¹
- 3.3 An approved agency is "approved" when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is accredited and listed in the ANAB directory.
- 3.4 An <u>approved source</u> is "approved" when a professional engineer (i.e., <u>Registered Design Professional</u>, hereinafter <u>RDP</u>) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.¹²
- 3.5 Testing and/or inspections conducted for this <u>duly authenticated report</u> were performed by an <u>ISO/IEC 17025</u> accredited testing laboratory, an <u>ISO/IEC 17020</u> accredited inspection body, and/or a licensed <u>RDP</u>.
 - 3.5.1 The Center for Building Innovation (CBI) is ANAB 13 ISO/IEC 17025 and ISO/IEC 17020 accredited.
- 3.6 The regulatory authority shall <u>enforce</u>¹⁴ the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in <u>writing</u>¹⁵ stating the nonconformance and the path to its cure.
- 3.7 The regulatory authority shall accept <u>duly authenticated reports</u> from an <u>approved agency</u> and/or an <u>approved source</u> with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction. ¹⁶
- 3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory. Therefore, recognition of certificates and validation statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope shall be approved. 17 Thus, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent, 18 and can be used in any country that is an MLA signatory found at this link: https://iaf.nu/en/recognised-abs/
- 3.9 Approval equity is a fundamental commercial and legal principle. 19

4 Applicable Local, State, and Federal Approvals; Standards; Regulations²⁰

- 4.1 Local, State, and Federal
 - 4.1.1 Approved in all local jurisdictions pursuant to ISO/IEC 17065 <u>duly authenticated report</u> use, which includes, but is not limited to, the following featured local jurisdictions: Austin, Baltimore, Broward County, Chicago, Clark County, Dade County, Dallas, Detroit, Denver, DuPage County, Fort Worth, Houston, Kansas City, King County, Knoxville, Las Vegas, Los Angeles City, Los Angeles County, Miami, Nashville, New York City, Omaha, Philadelphia, Phoenix, Portland, San Antonio, San Diego, San Jose, San Francisco, Seattle, Sioux Falls, South Holland, Texas Department of Insurance, and Wichita.²¹
 - 4.1.2 Approved in all state jurisdictions pursuant to ISO/IEC 17065 <u>duly authenticated report</u> use, which includes, but is not limited to, the following featured states: California, Florida, New Jersey, Oregon, New York, Texas, Washington, and Wisconsin.²²









- 4.1.3 Approved by the Code of Federal Regulations Manufactured Home Construction: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14²³ and Part 3280²⁴ pursuant to the use of ISO/IEC 17065 duly authenticated reports.
- 4.1.4 Approved means complying with the requirements of local, state, or federal legislation.
- 4.2 Standards
 - 4.2.1 ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures
 - 4.2.2 ASTM E935: Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings
 - 4.2.3 ASTM E985: Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
- 4.3 Regulations
 - 4.3.1 IBC 18, 21, 24: International Building Code®
 - 4.3.2 IRC 18, 21, 24: International Residential Code®

5 Listed²⁵

5.1 Equipment, materials, products, or services included in a List published by a <u>nationally recognized testing</u> <u>laboratory</u> (i.e., CBI), an <u>approved agency</u> (i.e., CBI and DrJ), and/or and <u>approved source</u> (i.e., DrJ), or other organization(s) concerned with product evaluation (i.e., DrJ), that maintains periodic inspection (i.e., CBI) of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

6 Tabulated Properties Generated from Nationally Recognized Standards

- 6.1 General
 - 6.1.1 Trex Signature Railing Systems are used as a guardrail system where a guardrail height of 42" is required in accordance with IBC Section 1015.2 and IRC Section R321.1.²⁶
- 6.2 Structural Performance
 - 6.2.1 Trex Signature Railing Systems were tested and meets the structural requirements of <u>IBC Section 1607.9</u> and IRC Section R301.5.









Table 7. Allowable Design Loads for Trex Signature Railing Systems

Parameter	Design Load⁴	
Trex Signature / Aluminum / Rod / Mesh Railing		
Infill Load ¹	50 lbf	
Uniform Load ²	50 plf	
Concentrated Load ³	200 lbf	
Trex Signature Glass Railing		
Infill Load ¹	50 lbf	
Uniform Load ²	-	
Concentrated Load ³	200 lbf	

SI: 1 lbf = 4.448 N, 1 plf = 14.6 N/m

- 1. Specified test in IBC Section 1607.9.1.2 and IRC Table R301.5.
- 2. Specified test in IBC Section 1607.9.1.
- 3. Specified test in IBC Section 1607.9.1.1 and IRC Table R301.5.
- 4. Design loads are applicable for the above infill systems installed with either Trex Signature or Trex Select Aluminum Posts in accordance with Section 9.
- 5. The 1/4" thick tempered glass infill panels are designed in accordance with maximum allowable stress of 6,000 psi
- 6.3 Where the application falls outside of the performance evaluation, conditions of use, and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science, and fire science.

7 Certified Performance²⁷

- 7.1 All construction methods shall conform to accepted engineering practices to ensure durable, livable, and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades. ²⁸
- 7.2 The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.²⁹

8 Regulatory Evaluation and Accepted Engineering Practice

- 8.1 Trex Signature Railing Systems were evaluated to determine the following:
 - 8.1.1 Structural performance in accordance with <u>IBC Section 1607.9</u> and <u>IRC Section R301.5</u>.
- 8.2 Any building code, regulation and/or accepted engineering evaluations (i.e., <u>research reports</u>, <u>duly authenticated reports</u>, etc.) that are conducted for this Listing were performed by DrJ, which is an <u>ISO/IEC 17065 accredited certification body</u> and a professional engineering company operated by <u>RDP</u> or <u>approved sources</u>. DrJ is qualified³⁰ to practice product and regulatory compliance services within its <u>scope of accreditation</u> and engineering expertise, ³¹ respectively.
- 8.3 Engineering evaluations are conducted with DrJ's ANAB <u>accredited ICS code scope</u> of expertise, which is also its areas of professional engineering competence.
- 8.4 Any regulation specific issues not addressed in this section are outside the scope of this report.







9 Installation

- 9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report, and the applicable building code.
- 9.2 In the event of a conflict between the manufacturer installation instructions and this report, contact the manufacturer for counsel on the proper installation method.
- 9.3 Installation Procedure
 - 9.3.1 Trex Signature Posts / Crossover Posts / Select Aluminum Posts to Wood:
 - 9.3.1.1 Blocking (2) shall be installed below all post locations in accordance with Figure 10 or Figure 11.
 - 9.3.1.1.1 Material shall be nominal 2 x 8 Pressure-Preservative-Treated (PPT) Southern Pine (SP), specific gravity of 0.55.
 - 9.3.1.1.2 Fasteners shall be #10 x 3" PPT compatible wood screws (36 screws per post location).
 - 9.3.1.1.3 If attaching posts directly to PPT wood, two stainless steel barrier strips shall be inserted under base plate of posts.
 - 9.3.1.1.3.1 Stainless steel barrier strips shall also be required for installation on concrete.
 - 9.3.1.1.4 Using the post as a template mark the locations of the four holes on the post and drill through the decking and blocking boards using a 5/8" masonry bit.
 - 9.3.1.1.5 Post shall be attached to the wood using four 3/8" x 6" hex cap bolts, washers, and nuts as depicted in **Figure 12**.
 - 9.3.1.1.5.1 If the project requires IRC compliance and uses the 2.5" (64mm) post then the back plate shown in **Figure 12** is required.

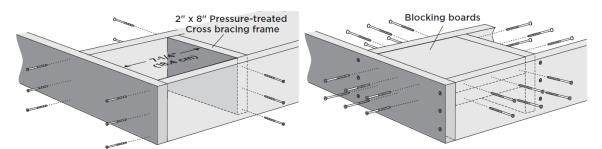


Figure 10. Corner Post Blocking - Post - Wood Installation

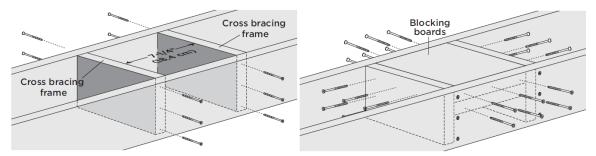


Figure 11. In-line Post Blocking – Post - Wood Installation









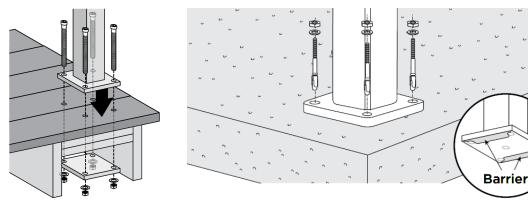


Figure 12. Post Installation into Wood (Left) and Concrete (Right)

- 9.3.2 Trex Signature Posts / Crossover Posts / Trex Aluminum Posts on Concrete:
 - 9.3.2.1 Using the post as a template mark the locations of the four holes on the post and drill into the concrete at least $2^5/8$ " using a 3/8" masonry bit.
 - 9.3.2.2 Post shall be attached to the concrete using four Trex supplied 3/8" x 33/4" wedge anchors as depicted in **Figure 12**. Use appropriate shims if the posts are not plumb.
 - 9.3.2.3 Fastening schedule per component is presented in **Table 8** and **Table 9**.

Table 8. Fastening Schedule for Trex Signature Aluminum and Rod Rail Systems

Component	Connection	Details
	Standard Bracket to Post	Three #10-16 x 5/8" pan head, self-drilling, stainless steel screws.
	Standard Bracket to Rail	Two #10-16 x ⁵ / ₈ " pan head, self-drilling, stainless steel screws.
	Side-Fastening Bracket to Rail	Two #10-16 x 1" flat head, self-drilling, stainless steel screws.
Top Rail	Crossover Bracket to Post	Compression fit - no mechanical connection; One $^{5}/_{16}$ " 18 x 2" hex-head bolt with nut inserted through a $1^{1}/_{2}$ " wide by $2^{3}/_{16}$ " long by 0.23" thick aluminum plate washer and the crossover bracket. A $2^{5}/_{16}$ " wide x $2^{3}/_{16}$ " long by $^{13}/_{16}$ " high expandable extrusion is slid over the plate washer. The assembly is placed in the post and the nut tightened which causes the expandable extrusion to expand, locking it into the post.
	Crossover Bracket to Rail	Two #10 16 x 5/8" pan head, self-drilling, stainless steel screws.
Dottom Dail	Bracket to Post	Two #10 16 x 5/8" pan head, self-drilling, stainless steel screws.
Bottom Rail	Bracket to Rail	One #10 16 x 5/8" pan head, self-drilling, stainless steel screws.
Baluster	Baluster to Top/Bottom/Intermediate Rail	No mechanical connection; slip fit into routing.
Intermediate Vertical Support (Trex Signature Rod Rail)	Intermediate Baluster to Top/Bottom Rail	Two #8 15 x 1 ¹ / ₄ " pan head stainless steel screw at each end.









Table 9. Fastening Schedule for Trex Signature Mesh and Glass Railing Systems

Component	Connection	Details	
	Standard Bracket to Post	Three #10 16 x 5/8" pan head, self-drilling, stainless steel screws.	
	Standard Bracket to Rail	Two #8 15 x 11/4" pan head stainless steel screw.	
Top Rail	Crossover Bracket to Post	Post Compression fit - no mechanical connection; One 5/16" 18 x 2" hex-head bolt with nut inserted through a 11/2" wide by 23/16 long by 0.23" thick aluminum plate washer and the crossover bracket. A 25/16" wide x 23/16" long by 13/16" high expandable extrusion is slid over the plate washer. The assembly is placed in the post and the nut tightened which causes the expandable extrusion to expand, locking it into the post.	
	Crossover Bracket to Rail	Two #8 15 x 11/4" pan head stainless steel screw at each end.	
Bottom Rail	Bracket to Post	Two #10 16 x 5/8" pan head, self-drilling, stainless steel screws.	
	Bracket to Rail	No mechanical connection; secure with 3/4" square adhesive strip.	
Center Baluster (Mesh Railing Only)	Vertical Baluster to Top/Bottom Rail	Plastic angle connects the support baluster to the top/bottom rail; the angle is compression fit into the baluster and attached to the top/bottom rail with one #8 18 x 5/8" trim head, stainless steel screw.	
Mesh/Glass Infill Mesh/Glass Infill to Top/Bottom Rail		No mechanical connection; slip fit into provided inserts.	

Table 10. Fastening Schedule for Trex Signature Post or Trex Select Aluminum Post to Substructure

Component	Substrate	Details
Signature Post Crossover Post	Wood	Four (4) $^{3}/_{8}$ " x 6" hex cap bolts, washers, and nuts. An aluminum back plate is required for IRC compliance with the 2.5" post.
Select Aluminum Post	Concrete	Four (4) 3/8" x 3-3/4" wedge anchors.

9.3.3 Installation of Trex Signature Railing Systems shall be on Trex Signature®, Trex Transcend Lineage®, Trex Transcend®, Trex Select® or Trex Enhance® decking or decking with equivalent properties.

10 Substantiating Data

- 10.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
 - 10.1.1 ASTM E935 test reports from approved sources:
 - 10.1.1.1 In-fill load tests
 - 10.1.1.2 Uniform load tests
 - 10.1.1.3 Concentrated load tests
- 10.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or an RDP. Accuracy of external test data and resulting analysis is relied upon.









- 10.3 Where applicable, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.
- 10.4 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, or <u>duly authenticated reports</u> from <u>approved agencies</u> and/or <u>approved sources</u> provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this <u>duly authenticated report</u>, may be dependent upon published design properties by others.
- 10.5 Testing and Engineering Analysis
 - 10.5.1 The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.³²
- 10.6 Where additional condition of use and/or regulatory compliance information is required, please search for Trex Signature Railing Systems on the <u>DrJ Certification website</u>.

11 Findings

- 11.1 As outlined in **Section 6**, Trex Signature Railing Systems have performance characteristics that were tested and/or meet applicable regulations. In addition, they are suitable for use pursuant to its specified purpose.
- 11.2 When used and installed in accordance with this <u>duly authenticated report</u> and the manufacturer installation instructions, Trex Signature Railing Systems shall be approved for the following applications:
 - 11.2.1 Use as a guardrail system where a guardrail height of 36" or 42" is allowed in accordance with <u>IBC Section</u> 1015 and IRC Section R321.³³ See **Section 12** for limitations.
- 11.3 Any application specific issues not addressed herein can be engineered by an <u>RDP</u>. Assistance with engineering is available from Trex Company, Inc.
- 11.4 IBC Section 104.2.3³⁴ (IRC Section R104.2.2³⁵ and IFC Section 104.2.3³⁶ are similar) in pertinent part state:
 - **104.2.3 Alternative Materials, Design and Methods of Construction and Equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.
- 11.5 Approved: 37 Building regulations require that the building official shall accept duly authenticated reports. 38
 - 11.5.1 An approved agency is "approved" when it is ANAB ISO/IEC 17065 accredited.
 - 11.5.2 An approved source is "approved" when an RDP is properly licensed to transact engineering commerce.
 - 11.5.3 Federal law, <u>Title 18 US Code Section 242</u>, requires that, where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. Denial without written reason deprives a protected right to free and fair competition in the marketplace.
- 11.6 DrJ is a licensed engineering company, employs licensed <u>RDP</u>s and is an <u>ANAB Accredited Product</u> Certification Body Accreditation #1131.
- 11.7 Through the <u>IAF Multilateral Arrangement</u> (MLA), this <u>duly authenticated report</u> can be used to obtain product approval in any <u>jurisdiction</u> or <u>country</u> because all ANAB ISO/IEC 17065 <u>duly authenticated reports</u> are equivalent.³⁹









12 Conditions of Use

- 12.1 Material properties shall not fall outside the boundaries defined in **Section 6**.
- 12.2 As defined in **Section 6**, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.
- 12.3 Trex Signature Railing Systems have been evaluated only for live loads for use as guards. Other loadings are outside of the scope of this report.
- 12.4 Attachment of Trex Signature Railing Systems to decking other than Trex Transcend, Select or Enhance decking is outside the scope of this report.
 - 12.4.1 *Exception:* Decking with equivalent compressive strength is permitted.
- 12.5 The center-to-center spacing of posts shall not exceed the spans listed in **Table 1**.
- 12.6 Trex Signature Aluminum Rod and Mesh Railings
 - 12.6.1 Application compliant for any occupancy groups specified in <u>IBC Section 302</u> and IRC one and two-family dwellings.
- 12.7 Trex Signature Glass Railing
 - 12.7.1 Use of Trex Signature Glass Railing is limited to IBC and IRC one and two-family dwellings.
 - 12.7.2 Trex Signature Glass Railing shall not be used in windborne debris regions per IRC Section R301.2.1.2.
 - 12.7.3 The glass infill section is to be considered a hazardous location per $\underline{\sf IBC}$ Section 2406.4.4 and $\underline{\sf IRC}$ Section R324.4.4.40
 - 12.7.4 Must have each glass section permanently etched with the manufacturer name/logo and applicable test standard per IRC Section R324.1.⁴¹
- 12.8 The compatibility of the fasteners and all other metallic parts listed in this report with the supporting structure is outside the scope of this report.
- 12.9 This report does not cover the compatibility of fasteners and metallic components with the support structure. This includes treated wood products.
- 12.10 Shim plates made from stainless steel must be used to prevent direct contact between the post base plate and the supporting structure.
- 12.11 When required by adopted legislation and enforced by the <u>building official</u>, also known as the Authority Having Jurisdiction (AHJ) in which the project is to be constructed:
 - 12.11.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.
 - 12.11.2 This report and the installation instructions shall be submitted at the time of permit application.
 - 12.11.3 These innovative products have an internal quality control program and a third-party quality assurance program.
 - 12.11.4 At a minimum, these innovative products shall be installed per Section 9.
 - 12.11.5 The review of this report by the AHJ shall comply with IBC Section 104.2.3.2 and IBC Section 105.3.1.
 - 12.11.6 These innovative products have an internal quality control program and a third party quality assurance program in accordance with <u>IBC Section 104.7.2</u>, <u>IBC Section 110.4</u>, <u>IBC Section 1703</u>, <u>IRC Section R104.7.2</u>, and <u>IRC Section R109.2</u>.
 - 12.11.7 The application of these innovative products in the context of this report is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2, and any other regulatory requirements that may apply.









- 12.12 The approval of this report by the AHJ shall comply with <u>IBC Section 1707.1</u>, where legislation states in part, "the <u>building official</u> shall make, or cause to be made, the necessary tests and investigations; or the <u>building official</u> shall accept duly authenticated reports from <u>approved agencies</u> in respect to the quality and manner of use of new materials or assemblies as provided for in <u>Section 104.2.3</u>", all of <u>IBC Section 104</u>, and <u>IBC Section 105.3</u>.
- 12.13 <u>Design loads</u> shall be determined in accordance with the regulations adopted by the <u>jurisdiction</u> in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).
- 12.14 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

13 Identification

- 13.1 Trex Signature Railing Systems, as listed in **Section 1**, are identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.
- 13.2 Additional technical information can be found at www.trex.com.

14 Review Schedule

- 14.1 This report is subject to periodic review and revision. For the latest version, visit www.drjcertification.org.
- 14.2 For information on the status of this report, please contact <u>DrJ Certification</u>.









Notes

- For more information, visit <u>dricertification.org</u> or call us at 608-310-6748.
- ² Capitalized terms and responsibilities are defined pursuant to the applicable building code, applicable reference standards, the latest edition of <u>TPI1</u>, the <u>NDS</u>, <u>AISI S202</u>, <u>US</u> professional engineering law, <u>Canadian building code</u>, <u>Canada professional engineering law</u>, <u>Qualtim External Appendix A</u>: <u>Definitions/Commentary</u>, <u>Qualtim External Appendix B</u>: <u>Project/Deliverables</u>, <u>Qualtim External Appendix C</u>: <u>Intellectual Property and Trade Secrets</u>, definitions created within Design Drawings and/or definitions within Reference Sheets. Beyond this, terms not defined shall have ordinarily accepted meanings as the context implies. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.
- 3 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1702
- Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review https://www.justice.gov/atr/mission and http
- https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-
- tests#1706.2:~:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests

 The design stress the and parmissible stresses of any structural material shall conform to the angular translation and mathed of design of any
- The <u>design strengths</u> and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. <a href="https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.1:~:text=Conformance%20to%20Standards-,The%20design%20strengths%20and%20permissible%20stresses,-of%20any%20structural
- https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20make%2C%20or%20cause%20to%20be%20made%2C%20the%20necessary%20tests%20and%20investigations%3B%20or%20the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20or%20mav20materials%20or%20assemblies%20as%20provided%20for%20in%20section%20104.2.3.
- 8 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4.2
- https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_agency
- https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_source
- https://www.law.cornell.edu/uscode/text/18/1832 (b) Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of \$5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a public records act. To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.
- https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/
- 13 https://www.cbitest.com/accreditation/
- 14 https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.1:~:text=directed%20to%20enforce%20the%20provisions%20of%20this%20code
- https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3 AND https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#105.3.1
- https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1
- 17 <u>https://iaf.nu/en/about-iaf-</u>
 - mla/#:~:text=Once%20an%20accreditation%20body%20is%20a%20signatory%20of%20the%20IAF%20MLA%2C%20it%20is%20required%20to%20recognise%20certificates%20 and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope
- 18 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- 19 https://www.justice.gov/crt/deprivation-rights-under-color-law AND https://www.justice.gov/atr/mission
- Unless otherwise noted, the links referenced herein use un-amended versions of the 2024 International Code Council (ICC) 2024 International Code Council (ICC) model codes as foundation references. Mississippi versions of the IBC 2024 and the IRC 2024 are un-amended. This material, product, design, service and/or method of construction also complies with the 2000-2012 versions of the referenced codes and the standards referenced therein. As pertinent to this technical and code compliance evaluation, CBI and/or DrJ staff have reviewed any state or local regulatory amendments to assure this report is in compliance.
- 21 See Adoptions by Publisher for the latest adoption of a non-amended or amended model code by the local jurisdiction. https://up.codes/codes/general
- 22 See Adoptions by Publisher for the latest adoption of a non-amended or amended model code by state. https://up.codes/codes/general
- https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14
- https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280
- https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2(Listed%20or%20certified); https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#listed AND https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#labeled
- 26 2021 IRC Section R312.1
- https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4
- https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%2C%20livable%2C%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades
- https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=The%20strength%20and%20rigidity%20of%20the%20component%20parts%20and/or%20the%20integrated%20structure%20shall%20be%20determined%20by%20 engineering%20analysis%20or%20by%20suitable%20load%20tests%20to%20simulate%20the%20actual%20loads%20and%20conditions%20of%20application%20that%20occur









- Qualification is performed by a legislatively defined <u>Accreditation Body</u>. <u>ANSI National Accreditation Board (ANAB)</u> is the largest independent accreditation body in North America and provides services in more than 75 countries. <u>DrJ</u> is an ANAB accredited <u>product certification body</u>.
- https://anabpd.ansi.org/Accreditation/product-certification/AllDirectoryDetails?prgID=1&orgID=2125&statusID=4#:~:text=Bill%20Payment%20Date-,Accredited%20Scopes,-13%20ENVIRONMENT.%20HEALTH
- 32 See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition: https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280
- 33 2021 IRC Section R312
- 34 <u>2021 IBC Section 104.11</u>
- 35 2021 IRC Section R104.11
- 36 2018: https://up.codes/viewer/wyoming/ifc-2018/chapter/1/scope-and-administration#104.9 AND 2021: https://up.codes/viewer/wyoming/ibc-2021/chapter/1/scope-and-administration#104.11
- ³⁷ Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 (https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#201.4) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.
- https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1
- 39 Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- 40 <u>2021 IRC Section R308.4.4</u>
- 41 <u>2021 IRC Section R308.1</u>