



**GAF-ELK Composite Building Products, Inc**  
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## 1.0 Subject

GAF-ELK Composite Building Products, Inc  
*CrossTimbers® Signature Series* and  
*Signature Series Select* Guardrail Systems

## 2.0 Research Scope

### 2.1. Building codes:

- 2006 International Building Code (IBC)
- 2006 International Residential Code (IRC)
- 1997 Uniform Building Code (UBC)

### 2.2. Properties:

- Structural performance
- Durability
- Surface Burning
- Decay Resistance
- Termite Resistance

## 3.0 Description

3.1. General – GAF-ELK *Building Products, Inc., Signature Series and Signature Series Select* Guard Systems are guards or 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 codes.

3.2. *Signature Series* Guard Systems are level guards up to 8 ft (96- inches) in length, center-to-center. of support posts and, a maximum installed height of 42 inches.

3.3. *Signature Series Select* Guard Systems are level guards up to 8 ft (96- inches) in length, center-to-center. of support posts and, a maximum installed height of 36 inches.

3.4. *Signature Series and Signature Series Select* Guard Systems are an assemblage of extruded components made of a composite of polypropylene and natural fiber materials. The composite components recognized in this report are New Cedar, Pewter Gray, Sandalwood, Weatheredwood and Onyx in color. Aluminum balusters are recognized in the *Signature Series Select* System.

3.5. Guard systems include a universal rail utilized as both the top and bottom rail, vertical balusters, structural 4 x 4 post, large and small Uni-Ball™ baluster connectors, rail to post brackets, support block, decorative moldings and post caps.

3.5.1. A Universal extruded composite rail having an overall sectional dimension of 3.3 inch wide by 2.2 inch tall is used for both the upper and lower rails. See Figure 1.

3.5.2. *Signature Series* baluster is composite material extruded with a 1.40 inch square sectional profile and 0.187 inch wall thickness with chamfered corners. See Figure 2.

3.5.2.1. *Signature Series* balusters are secured to the top and bottom rail with large (1.20" dia.) Uni-Ball™ connectors. The large Uni-Ball™ connectors are held to the rails by passing a #8 x 2.5 inch long SST screw through the hole in the center of the Uni-ball™ and screwing into the predrilled holes in the Universal Rail. See Figure 3.

3.5.3. *Signature Series Select* balusters are made of 0.75" diameter hollow Aluminum tubing. See Figure 4.

3.5.3.1. *Signature Series Select* aluminum balusters are secured to the top and bottom rail with small Uni-Ball™ connectors. The small (0.665" dia.) Uni-Ball™ connectors are held to the rails by passing a #8 x 1.5 inch long SST screw through the hole in the center of the Uni-Ball™ and screwing into the predrilled holes in the Universal Rails. See Figure 5.

3.5.4. The baluster spacing resulting from assemblies recognized in this report shall provide spacing such that a 4 inch diameter sphere cannot pass through the opening between balusters.



3.5.5. Top and bottom rails are attached to 4 x 4 composite posts (Refer to Section 7.2 for Conditions of Use) or conventional 4 x 4 wood posts, via 0.122 inch (3mm) stainless steel angle brackets. See Figure 8.

3.5.6. A support block is installed between the lower rail and the deck surface, and midway between support posts. The single support block consists of a 1.40 inch square composite baluster cut to the appropriate length. It is attached to the lower rail with a large Uni-Ball™ connector.

3.5.7. A 4 x 4 structural post consisting of 0.75 inch thick extruded composite material can be utilized under the conditions indicated in Section 7.2 only. See Figure 6.

## 4.0 Performance Characteristics

4.1. The CrossTimbers® *Signature Series* and *Signature Series Select* Guardrail Systems described in this report have demonstrated the capacity to resist the design loadings specified in Chapter 16 of the IBC, Section R301 of IRC and UBC Chapter 16, 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 polypropylene and natural fiber composite material used in the *Signature Series* and *Signature Series Select* Guardrail system has a flame spread index of 90 when tested according to ASTM E84. The referenced criteria within AC174, requires the material to have a flame spread index not greater than 200 when tested according to ASTM E84.

## 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. The universal rails used for both the top and bottom rails are attached to the structural 4 x 4 composite post utilizing stainless steel angle brackets. Fasteners used in the assembly are in accordance with Table 1.

5.2. The baluster connections to both the top and bottom rails are made utilizing a Uni-ball™ connector at each attachment point. Stainless steel fasteners used to attach the Uni-ball™ connectors to the rails are different in length for the composite picket and aluminum tubing balusters. Fasteners used in baluster assembly are in accordance with Table 1.

5.3. The 4 x 4 square composite structural post (Refer to Section 7.2 for Conditions of Use), is attached to the inside (deck side) of the structural support framing with two (2) ½ inch stainless steel hex-head bolts. The bolts shall pass through pre-drilled holes in the post and structural support and utilizes ½ inch heavy duty washers on both ends. Refer to Figures 6 and 7 for locations.

## 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 Acceptance Criteria for Deck Board Span ratings and Guardrail Systems (Guards and Handrails), AC174 approved February 2007, effective March 1, 2007 revised April 2008

6.3. A quality control manual that is in accordance with the ICC-ES AC10, "Acceptance Criteria for Quality Documentation".

## 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. The guard systems shall be installed 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.

7.2. The *Signature Series Select* Guard System and the 4 x 4 structural composite post, shown in Figure 6, are limited to exterior use in one and two family dwellings as regulated by the IRC and additionally, residential use groups R3 and R4 of the IBC. These posts cannot be notched and must use the fastener spacing shown in Figure 7.



7.3. *Signature Series* Guardrail systems utilizing conventional wood supports are 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 One and Two Family Dwellings regulated by the IRC.

7.4. Guards recognized in this report and regulated by the UBC are limited to exterior use in construction types III, IV and V of the UBC

7.5. Uni-Ball™ connectors shall not be reused in the event that balusters or foot blocks are assembled over the Uni-Ball™ connectors and are re-separated for any reason.

7.6. Conventional wood supports and supporting structure for guards are not within the scope of this report and are subject to evaluation and approval by the building official. Design and construction of supports and supporting structures must satisfy the design load requirements specified in Chapter 16 of the IBC, Chapter 16 of the UBC and must provide suitable material for anchorage of the rail brackets and posts. Where required by the building official, engineering calculations and details shall be provided.

7.7. 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.

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

7.9. GAF-ELK Composite Building Products Inc., CrossTimbers® *Signature and Signature Series Select* guard systems are manufactured in Lenexa Kansas in accordance with the manufacturers approved quality control system with inspections by Architectural Testing, Inc. (AA-676).

### 8.0 Identification

The guard assemblies produced by GAF-ELK Composite Building Products Inc., 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, the identifying mark of the independent inspection agency, Architectural Testing, Inc. (AA-676) and, the ATI Code Compliance Research Report Number (CCRR-0116).

### 9.0 Code Compliance Research Report Use

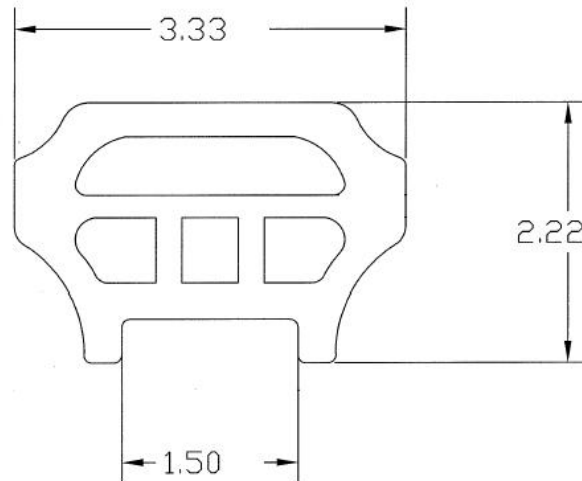
9.1. Approval of building products and/or materials can only be granted by a building official having legal authority in the specific jurisdiction where approval is sought.

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

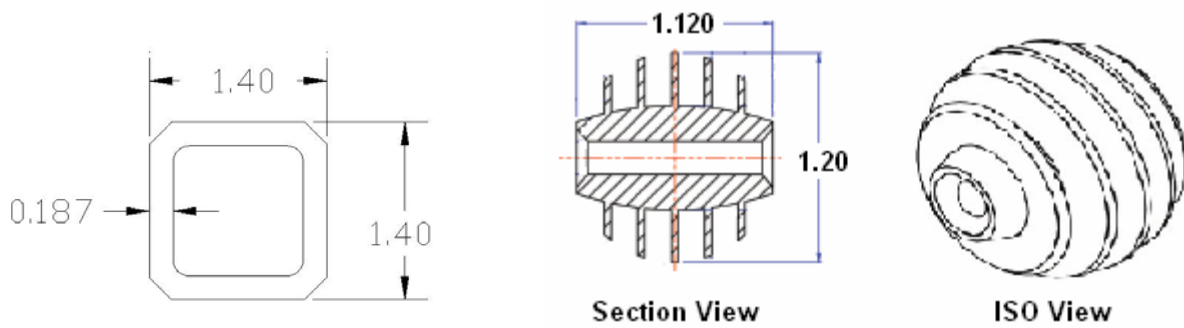
**Table 1  
Rail/Baluster Fastening Schedule**

<b>Cross Timbers Railing System</b>	<b>Baluster to Uni-Ball Connector</b>	<b>Rail to Bracket</b>	<b>Bracket to Post</b>
<i>Signature Series</i>	Large Uni-Ball™ #8 X 2.5" long SST screw	Two (2) #14 x 1-3/4" Stainless Steel Pan Head Screws	Two (2) #14 x 1-3/4" Stainless Steel Pan Head Screws
<i>Signature Series Select</i>	Small Uni-Ball™ #8 X 1.5" long SST screw		



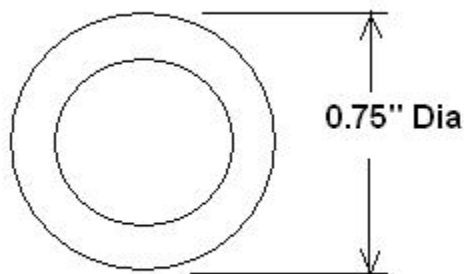
Note: An identical rail profile is used for lower rail

**Figure 1 – Rail Profile**  
*Signature Series and Signature Series Select*

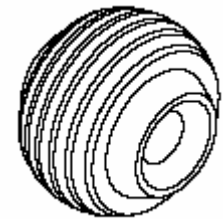
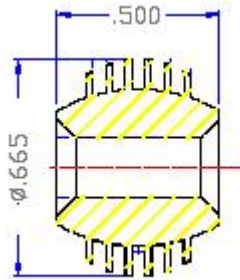


**Figure 2**  
**Composite Baluster Profile**  
*Signature Series*

**Figure 3**  
**Large (1.20" dia.) Uni-Ball™ Connector**  
*Signature Series*



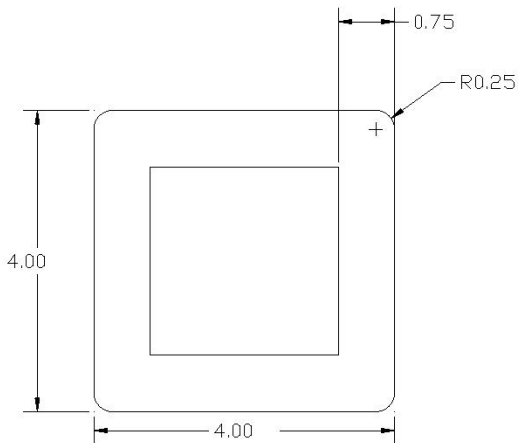
**Figure 4**  
**Aluminum Baluster Profile**  
*Signature Series Select*  
(Refer to Section 7.2 for Conditions of Use)



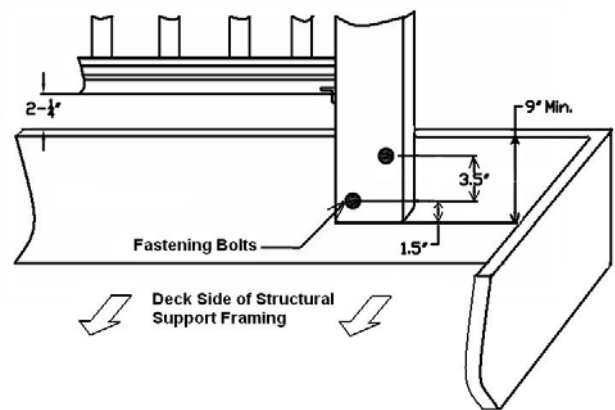
Section View

ISO View

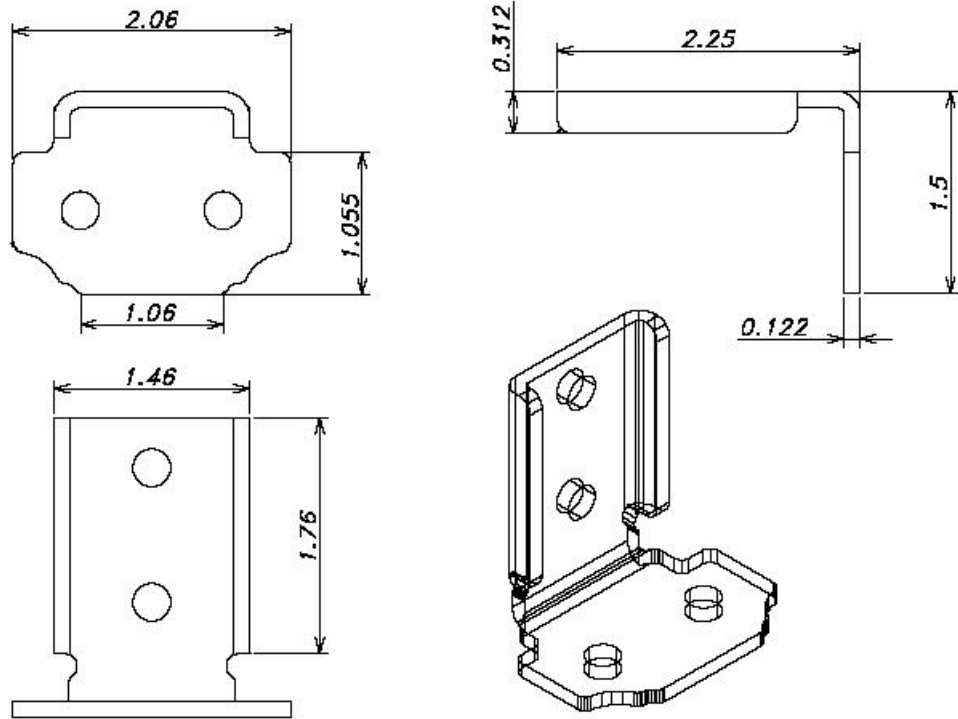
**Figure 5**  
**Small (0.665" dia) Uni-Ball™ Connector**  
*Signature Series Select*  
(Refer to Section 7.2 for Conditions of Use)



**Figure 6**  
**4 x 4 Composite Post Profile**  
*Signature Series and Signature Series Select*  
(Refer to Section 7.2 for Conditions of Use)



**Figure 7**  
**4 x 4 Post Fastener Arrangement**  
*Signature Series and Signature Series Select*



**Figure 8 – Attachment Bracket**  
*Signature Series and Signature Series Select*