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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:
Mineral-PVC Guardrail Systems

- 2x4
- Classic Grab & Go
- Contemporary Grab & Go

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. Previous Code sections may differ.

1.2 Mineral-PVC Guardrail Systems have been evaluated for the following properties:

- Structural Performance
- Durability
- Surface Burning Characteristics

1.3 Mineral-PVC Guardrail Systems have been evaluated for the following uses:

- Guards intended for exterior use at or near the open sides of elevated walking areas in buildings and walkways, including stairs and ramps, as required by the referenced codes.

- Guardrail systems referenced 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 705.2.2 and 2612.3 and 2015 IBC Section 1406.3, Exceptions 2 and 3. Guardrails less than 42-inches-high are limited to use in One- and Two-Family Dwellings (IRC). See Table 1 for additional restrictions based upon Use and Occupancy classification.

2.0 STATEMENT OF COMPLIANCE

Mineral-PVC Guardrail Systems comply 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.

3.0 DESCRIPTION

3.1 Mineral-PVC Guardrail Systems are guardrails under the definitions of the referenced codes.

3.2 Level guards are provided in rail lengths up to 93 inches between supports and installed height of up to 42 inches. See Table 1 for qualified lengths and configurations.

3.3 Stair guards are provided in rail lengths up to 68 inches measured along the sloping length between supports and an installed height of up to 42 inches at the leading edge of the stair tread or landing. See Table 1 for qualified lengths and configurations.



3.4 The Mineral-PVC Guardrail Systems are an assemblage of an extruded mineral-PVC (M-PVC) material along with other metal and plastic parts. The M-PVC and plastic parts are produced in white. Guardrail systems include:

3.4.1 2x4 M-PVC Guardrail System (see Figures 1, 5-9), comprised of a single coextruded profile used for both the top and bottom rail. See Table 1 and Figures 23-31 for approved balusters.

3.4.2 Classic Grab & Go Guardrail System (see Figures 2, 10-22), comprised of independent coextruded profiles for the top and bottom rails. Balusters are a 1.25-inch-square coextruded profile (see Figure 22).

3.4.3 Contemporary Grab & Go Guardrail System (see Figures 3, 11, 13-14, 16, 20-21), comprised of a single coextruded profile used for both the top and bottom rail. *Classic* round aluminum balusters are used (see Figure 26).

3.5 Four structural supports may be used. See Table 1 for qualified lengths and configurations:

3.5.1 Conventional wood framing. Coextruded M-PVC post sleeves are installed over a conventional 4x4 preservative treated wood post (see Figure 4).

3.5.2 *Deckorators Deck Post Mount* (also known as *Atlas-Pro Quik-Mount Post Mount*) System. M-PVC post sleeves and post spacers are installed over the post mount (see Figure 4). The *Deckorators Deck Post Mount* System is documented in Intertek CCRR-0257.

3.5.3 LMT *Blu-Mount* Post Mount System. M-PVC post sleeves and post spacers are installed over the post mount (see Figure 4).

3.5.4 LMT *LC Galvanized* Post Mount System. M-PVC post sleeves and post spacers are installed over the post mount (see Figure 4).

3.6 Top and bottom rails are attached directly to structural supports with molded plastic mounting brackets for level and stair applications. See Tables 2, 3 and 4 and Figures 6-9 and 12-21.

4.0 PERFORMANCE CHARACTERISTICS

4.1 The M-PVC Guardrail Systems 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 D7032.

4.2 Structural performance has been demonstrated for a temperature range of -20°F to 125°F.

4.3 The M-PVC material used in the guardrail systems has a flame spread index not exceeding 200 when tested in accordance with ASTM E84.

5.0 INSTALLATION

5.1 General:

Mineral-PVC Guardrail Systems 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 Application:

5.2.1 The *Deckorators Deck Post Mount* may be anchored to concrete or wood in accordance with the manufacturer's published instructions and Section 5.0 of CCRR-0257.

5.2.2 The LMT *Blu-Mount* Post must be anchored to concrete or wood in accordance with the manufacturer's published instructions.

5.2.3 The LMT *LC Galvanized* Post must be anchored to concrete or wood in accordance with the manufacturer's published instructions.

5.2.4 The top and bottom rails are attached directly to structural supports utilizing plastic mounting brackets. See Tables 2, 3, and 4 for fastening.

5.2.5 The top and bottom rails may be attached to conventional wood supports. Conventional wood supports including wood posts are outside the scope of this report.





5.2.6 4x4 conventional wood posts, *Deckorators Deck Post Mounts*, LMT *Blu-Mount* posts, and LMT *LC Galvanized* posts may be covered by M-PVC post sleeves, decorative caps, and moldings.

5.2.7 Support blocks are installed between the bottom rail and the deck surface. One support is used for rail lengths up to 6 feet, and two supports are used for rail lengths up to 8 feet (34-inch maximum spacing between supports).

5.2.8 Contemporary Grab & Go Balusters are restrained within routed holes in the top and bottom rail.

5.2.9 Classic Grab & Go Balusters may be restrained within routed holes in the top and bottom rail or secured to the top and bottom rails via plastic connectors. See Table 3 and Figures 32-33.

5.2.10 For the 2x4 Guardrail System, *Traditional*, *Baroque*, and *Arc* balusters are secured to the top and bottom rails with stainless steel screws. *Estate* and *Classic* balusters are secured to the top and bottom rail via plastic connectors. See Table 2 and Figures 23-31.

5.2.11 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 CONDITIONS OF USE

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, 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 (see Section 5.2.11). Where required by the building official, engineering calculations and details prepared by a licensed design professional shall be provided.

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

6.4 Only those types of fasteners and fastening methods described in this report have been evaluated for installation of the guardrail systems; other methods of attachment are outside the scope of this report.

6.5 Compatibility of supporting construction materials with all fasteners, metal post mount components, and other hardware components is subject to approval by the code official.

6.6 The Mineral-PVC Guardrail Systems are manufactured by UFP Ventures II, Inc under a quality control program with ongoing inspections.

7.0 SUPPORTING EVIDENCE

7.1 Drawings and installation instructions submitted by the manufacturer.

7.2 Reports of testing in accordance with ASTM D7032 and ASTM E84.

7.3 Data in accordance with the ICC-ES AC174, *Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails)*, revised December 2014.

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

8.0 IDENTIFICATION

The Mineral-PVC Guardrail Systems are identified with the manufacturer's name (UFP Ventures II, Inc), the product name, and the Code Compliance Research Report number (CCRR-0335).





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 – QUALIFIED GUARDRAIL SYSTEMS AND USE CATEGORIES

Guardrail System	Guardrail Type	Guardrail Dimensions ¹	Support Post	Baluster	Code Occupancy Classification			
Classic Grab & Go	Level (Inline/Angled)	92 in. x 42 in.	LMT <i>Blu-Mount</i> or Wood Post ³	1.25 in Square	IBC – All Use Groups			
		86 in. x 42 in.	<i>Deckorators Deck Post Mount</i>					
	Stair	67 in. x 42 in.	LMT <i>Blu-Mount</i> or Wood Post ³ or <i>Deckorators Deck Post Mount</i>					
	Level (Inline/Angled)	92 in. x 36 in.	LMT <i>LC Galvanized</i>			1.25 in Square	IRC – One- and Two-Family Dwellings	
Stair		67 in. x 36 in.						
Contemporary Grab & Go	Level (Inline/Angled)	68 in. x 42 in.	LMT <i>Blu-Mount</i> or Wood Post ³ or <i>Deckorators Deck Post Mount</i>	<i>Classic Round</i>	IBC – All Use Groups and IRC – One- and Two-Family Dwellings			
		Stair				67 in. x 42 in.		
	Level (Inline/Angled)	68 in. x 36 in.				LMT <i>LC Galvanized</i>	<i>Classic Round</i>	IRC – One- and Two-Family Dwellings
		Stair						
2x4	Level (Inline/Angled)	93 in. x 42 in.	Wood Post ³	<i>Traditional Estate Arc² Baroque Classic</i>	IBC – All Use Groups and IRC – One- and Two-Family Dwellings			
		Stair				72 in. x 42 in.		

¹Guardrails are qualified up to and including the listed maximum guardrail system dimensions for use in the referenced Code Occupancy Classification. Guardrail lengths are actual railing lengths, i.e. clear space between supports for level rails and sloping length of rail between supports for stair rails.

²The *Arc* baluster is qualified for use in a 36-inch guardrail only.

³ Wood support posts are not within the scope of this evaluation. See section 6.2.





TABLE 2 – FASTENING SCHEDULE FOR 2X4 M-PVC GUARDRAIL SYSTEMS

Connection	Fastener
Rail Bracket to Post (Level Inline)	Three #10-16 by 2 in. (0.133 in. minor diameter) pan head, stainless steel screws
Rail Bracket to Post (Angled)	Four #10-16 by 2 in. (0.133 in. minor diameter) pan head, stainless steel screws
Rail Bracket to Post (Stair)	Four #10-16 by 2 in. (0.133 in. minor diameter) pan head, stainless steel screws
Top Rail to Bracket (Level Inline / Stair)	Two #10-16 by 1 in. (0.133 in. minor diameter) pan head, stainless steel screws
Top Rail to Bracket (Angled)	Four #10-16 by 1 in. (0.133 in. minor diameter) pan head, stainless steel screws
Bottom Rail to Bracket (Level Inline / Stair)	Slip fit dovetail – no mechanical connection
Bottom Rail to Bracket (Angled)	Two #10-16 by 1 in. (0.133 in. minor diameter) pan head, stainless steel screws
<i>Traditional</i> Baluster to Rail	Two #8-15 by 1.5 in. (0.119 in. minor diameter) stainless steel screws (per end)
<i>Arc</i> Baluster to Rail	Two #8-15 by 1.5 in. (0.119 in. minor diameter) stainless steel screws (per end)
<i>Baroque</i> Baluster to Rail	Two #8-15 by 1.5 in. (0.119 in. minor diameter) stainless steel screws (per end)
<i>Estate</i> Baluster Connector to Rail	One #8-9 by 1.5 in. (0.014 in. minor diameter) stainless steel screw
<i>Estate</i> Baluster to Connector	Slip fit – no mechanical connection
<i>Classic</i> Baluster Connector to Rail	One #8-9 by 1.5 in. (0.014 in. minor diameter) stainless steel screw
<i>Classic</i> Baluster to Connector	Slip fit – no mechanical connection
Support Block to <i>Estate</i> Connector	One #8-9 by 1.5 in. screw through support block into connector

TABLE 3 – FASTENING SCHEDULE FOR CLASSIC GRAB & GO M-PVC GUARDRAIL SYSTEMS

Connection	Fastener
Angle Adapter Bracket to Post (Angled)	One #8-9 by 1.5 in. (0.111 in. minor diameter) pan head stainless steel screw
Rail Bracket to Post (Angled)	Four #9-15 by 3.5 in. (0.124 minor diameter) pan head stainless steel screws through angle adapter
Rail Bracket to Post (Level Inline or Stair)	Four #8-18 by 2 in. (0.118 in. minor diameter) pan head stainless steel screws
Rail Bracket to Top Rail (Level Inline)	Four #10-16 by 1 in. (0.135 in. minor diameter) pan head stainless steel screws
Rail Bracket to Top Rail (Stair)	Two #10-16 by 1 in. (0.135 in. minor diameter) pan head stainless steel screws
Rail Bracket to Bottom Rail	Two #10-16 by 1 in. (0.135 in. minor diameter) pan head stainless steel screws
Baluster to Rail or Connector	Slip fit – no mechanical connection
Baluster Connector to Rail (when used)	One #8-9 by 1.5 in. (0.014 in. minor diameter) stainless steel screw
Support Block Connector to Bottom Rail	One #8-9 by 1.25 in. (0.107 in. minor diameter) trim head stainless steel screw
Support Block to Support Block Connector	Slip fit – no mechanical connection

TABLE 4 – FASTENING SCHEDULE FOR CONTEMPORARY GRAB & GO M-PVC GUARDRAIL SYSTEMS

Connection	Fastener
Rail Bracket to Post (Angled)	Four #8-15 by 3.5 in. (0.116 minor diameter) pan head stainless steel screws through socket bracket and angle adapter into post
Rail Bracket to Post (Level Inline or Stair)	Four #8-18 by 2 in. (0.117 in. minor diameter) pan head stainless steel screws
Rail Bracket to Top Rail (Level Inline)	Four #10-16 by 1 in. (0.135 in. minor diameter) pan head stainless steel screws
Rail Bracket to Bottom Rail	Two #10-16 by 1 in. (0.135 in. minor diameter) pan head stainless steel screws
Baluster to Rails	Slip fit – no mechanical connection



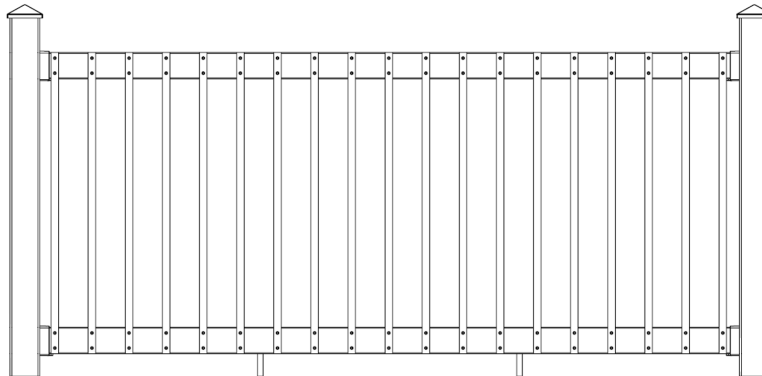


FIGURE 1 – 2X4 M-PVC GUARDRAIL SYSTEM

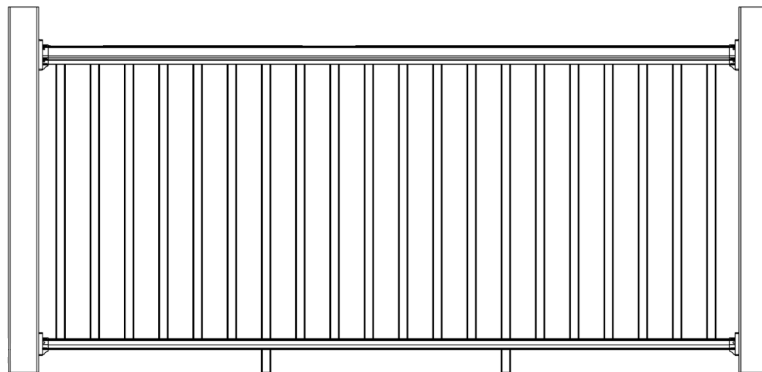


FIGURE 2 – CLASSIC GRAB & GO M-PVC GUARDRAIL SYSTEM

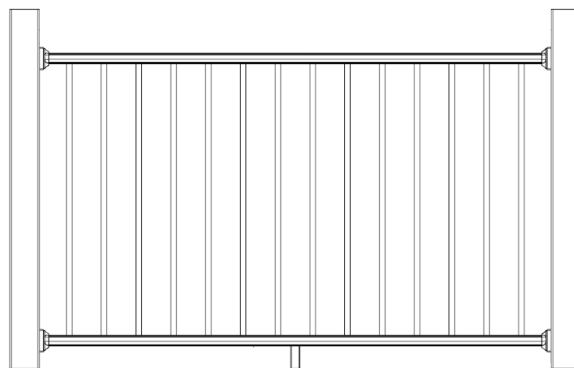


FIGURE 3 – CONTEMPORARY GRAB & GO M-PVC GUARDRAIL SYSTEM

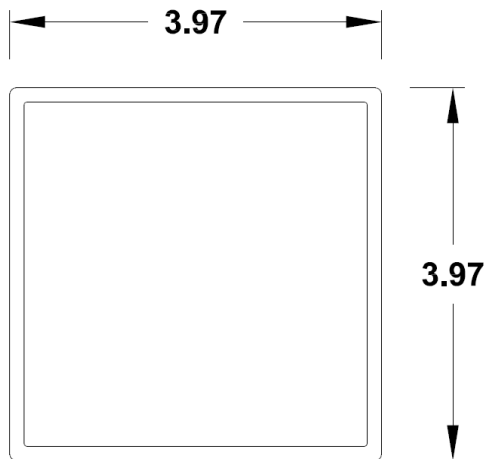


FIGURE 4 – POST SLEEVE

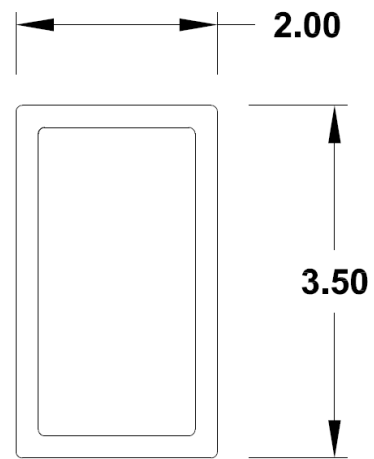


FIGURE 5 – 2X4 RAIL PROFILE

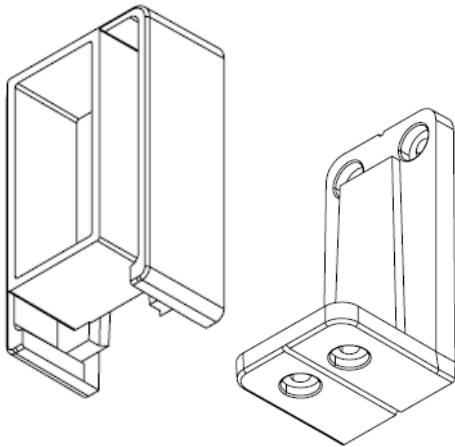


FIGURE 6 – 2X4 RAIL BRACKET – LEVEL INLINE

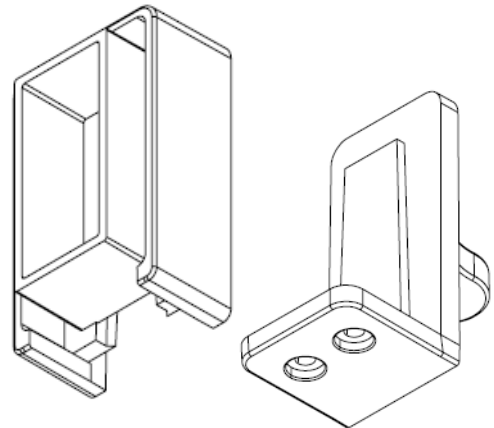


FIGURE 7 – 2X4 RAIL BRACKET – LEVEL ANGLED

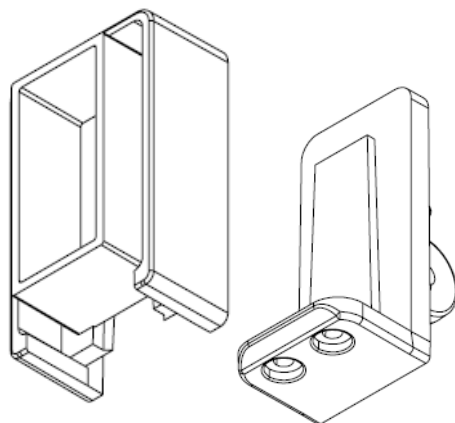


FIGURE 8 – 2X4 RAIL BRACKET – STAIR

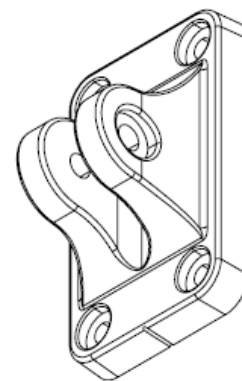


FIGURE 9 – 2X4 HINGE PLATE – STAIR & ANGLED



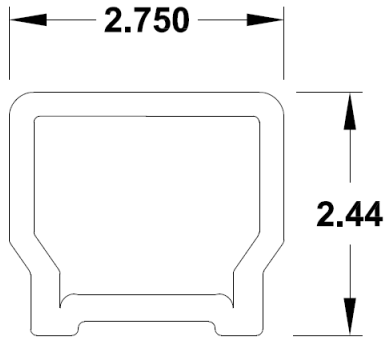


FIGURE 10 – CLASSIC GRAB & GO TOP RAIL PROFILE

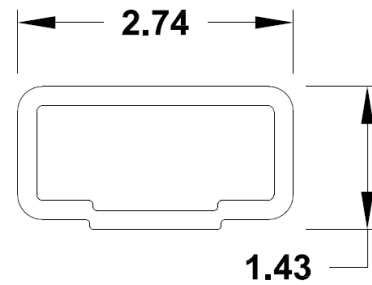


FIGURE 11 – CLASSIC GRAB & GO BOTTOM RAIL / CONTEMPORARY GRAB & GO RAIL PROFILE

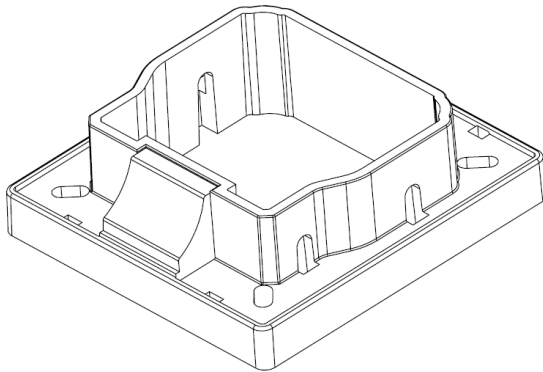


FIGURE 12 – CLASSIC GRAB & GO TOP RAIL BRACKET – LEVEL INLINE

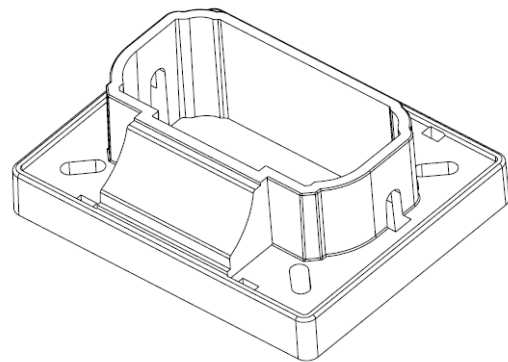


FIGURE 13 – CLASSIC GRAB & GO BOTTOM RAIL / CONTEMPORARY GRAB & GO RAIL BRACKET – LEVEL INLINE

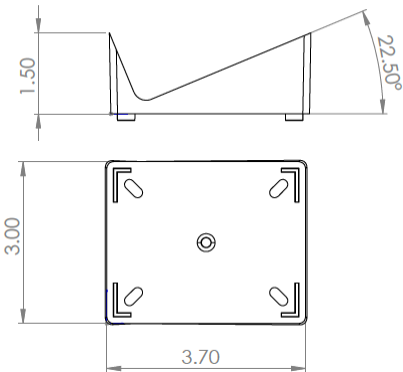


FIGURE 14 – 22.5° ANGLE BRACKET – CLASSIC GRAB & GO BOTTOM RAIL / CONTEMPORARY GRAB & GO RAIL

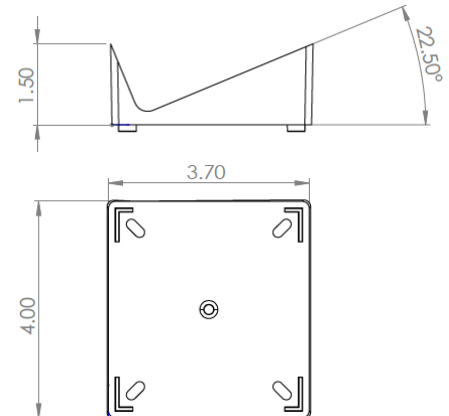
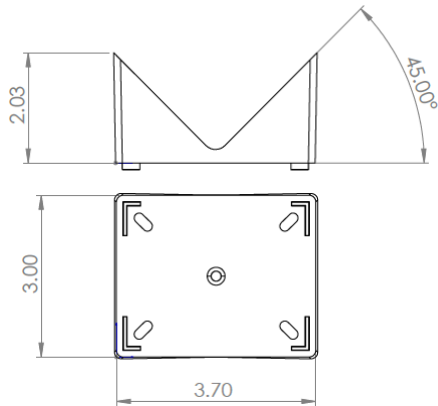
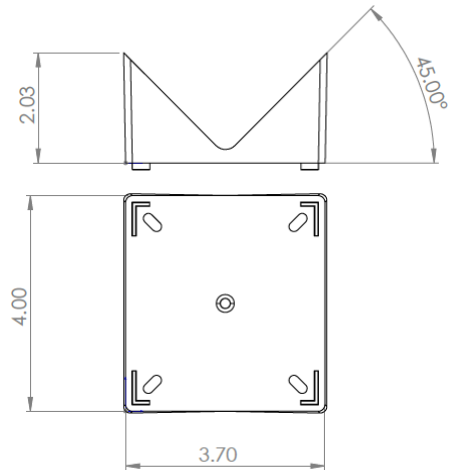


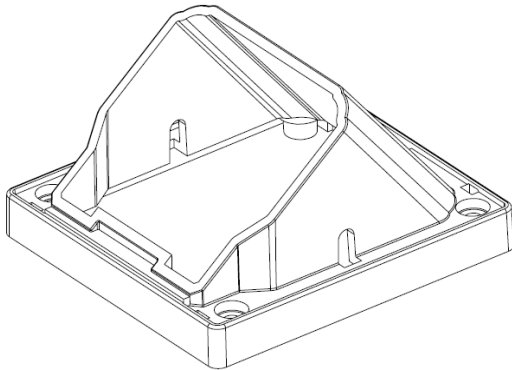
FIGURE 15 – 22.5° ANGLE BRACKET – CLASSIC GRAB & GO TOP RAIL



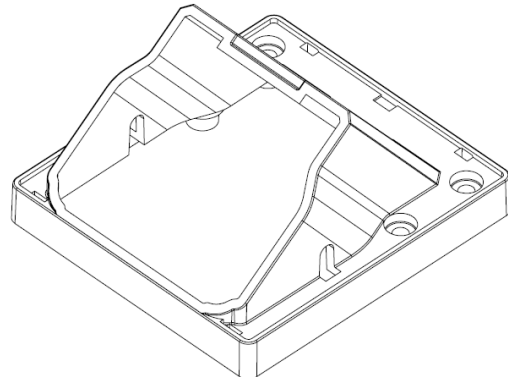
**FIGURE 16 – 45° ANGLE BRACKET – CLASSIC GRAB & GO
BOTTOM RAIL / CONTEMPORARY GRAB & GO**



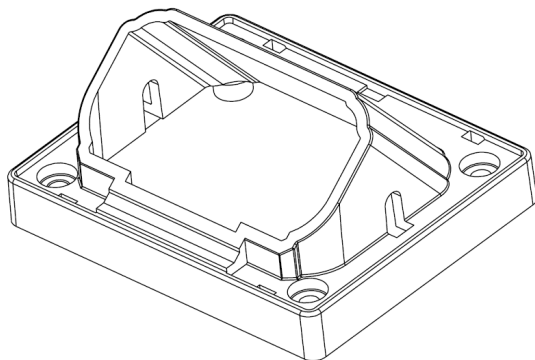
**FIGURE 17 – 45° ANGLE BRACKET –
CLASSIC GRAB & GO TOP RAIL**



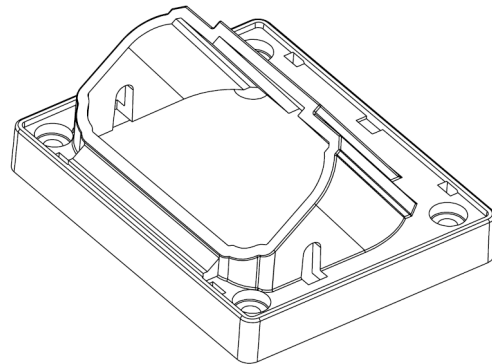
**FIGURE 18 – UPPER STAIR BRACKET –
CLASSIC GRAB & GO TOP RAIL**



**FIGURE 19 – LOWER STAIR BRACKET –
CLASSIC GRAB & GO TOP RAIL**



**FIGURE 20 – UPPER STAIR BRACKET – CLASSIC GRAB & GO
BOTTOM RAIL / CONTEMPORARY GRAB & GO**



**FIGURE 21 – LOWER STAIR BRACKET – CLASSIC GRAB & GO
BOTTOM RAIL / CONTEMPORARY GRAB & GO**



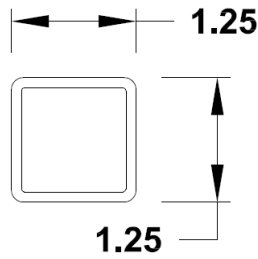


FIGURE 22 – CLASSIC GRAB & GO M-PVC BALUSTER PROFILE

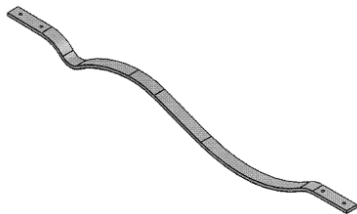


FIGURE 24 – BAROQUE ALUMINUM BALUSTER

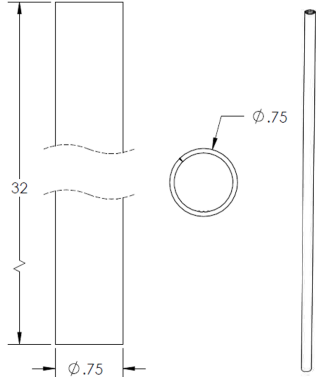


FIGURE 26 – CLASSIC ALUMINUM BALUSTER

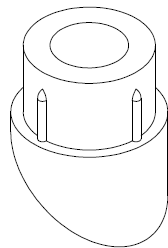


FIGURE 28 – CLASSIC BALUSTER CONNECTOR (2X4 GUARDRAIL STAIR APPLICATIONS)

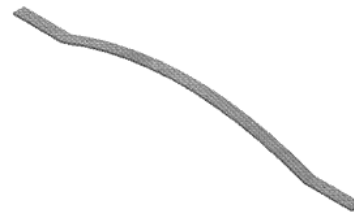


FIGURE 23 – ARC ALUMINUM BALUSTER

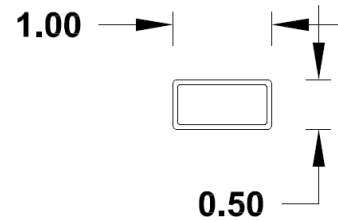


FIGURE 25 – TRADITIONAL ALUMINUM BALUSTER

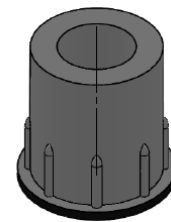


FIGURE 27 – CLASSIC BALUSTER CONNECTOR (2X4 GUARDRAIL LEVEL APPLICATIONS)

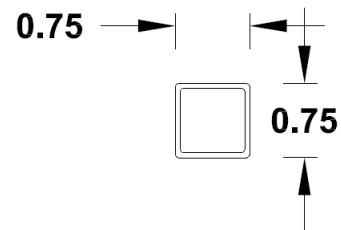


FIGURE 29 – ESTATE ALUMINUM BALUSTER

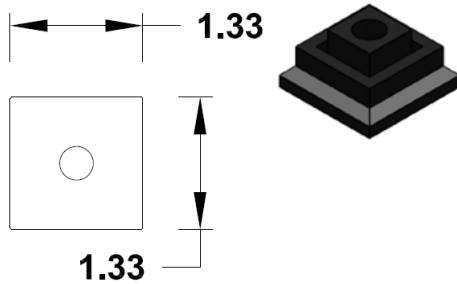


FIGURE 30 – ESTATE BALUSTER CONNECTOR (LEVEL)

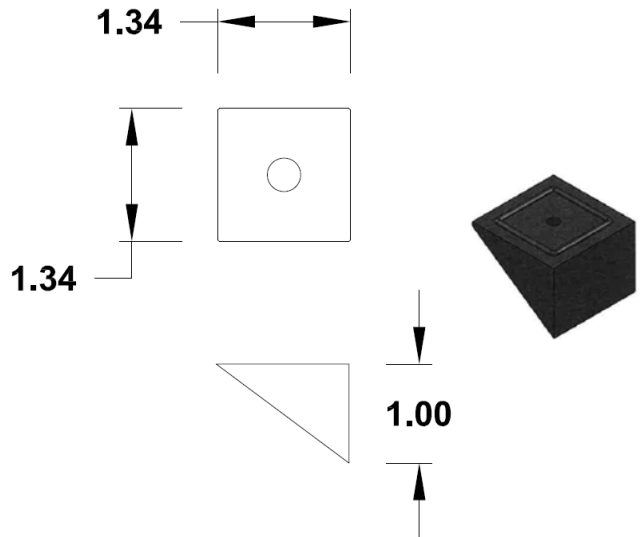


FIGURE 31 – ESTATE BALUSTER ADAPTOR (STAIR)

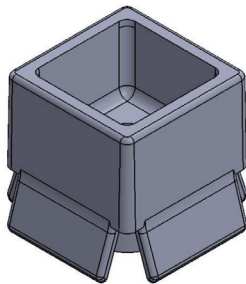


FIGURE 32 – HOLLOW BALUSTER CONNECTOR (LEVEL)

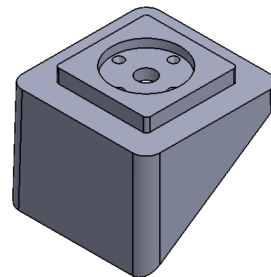


FIGURE 33 – HOLLOW BALUSTER ADAPTOR (STAIR)