ICC-ES Evaluation Report

ESR-2601

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This report is subject to re-examination in one year.

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DIVISION: 06—WOOD AND PLASTIC
Section: 06500—Structural Plastics
Section: 06610—Plastic Railing and Guards

REPORT HOLDER:

FYPON, LTD.
960 WEST BARRE ROAD
ARCHBOLD, OHIO 43502
(419) 445-0116
www.fypon.com
mschweitzer@fypon.com

EVALUATION SUBJECT:

QUICKRAIL™ SYNTHETIC RAILING SYSTEM

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)

Properties evaluated:

- Structural
- Durability
- Surface-burning characteristics

2.0 USES

The Quickrail™ Synthetic Railing System described in this report is limited to exterior use as guards for balconies, porches, decks and stairs. The product described in this report is used in exterior applications in Group R Occupancies (residential) in buildings of Type V-B (IBC) construction and other types of construction in applications where untreated wood is permitted by IBC Section 1406.3 or in buildings constructed in accordance with the IRC.

3.0 DESCRIPTION

3.1 General:

The Quickrail™ Synthetic Railing System is a guard consisting of post sleeves and caps and top and bottom rails, with aluminum and synthetic inserts, balusters, and a bottom-rail support block. The Quickrail™ Synthetic Railing System components are 100 percent PVC except for the aluminum and synthetic insert, which is made from aluminum alloy 6063-T6 and polypropylene. The minimum yield and tensile strengths, and minimum thickness, of the aluminum inserts are specified in the approved quality control manual. The Quickrail™ Synthetic Railing System is available in white and desert sand colors.

3.2 Guard:

The height of the railing assembly is 36 inches or 42 inches (914 or 1067 mm) above the walking surface. Each post is covered with a 4-inch-by-4-inch PVC sleeve. The top rail has a T-shape and the bottom rail is rectangular. The T-shaped rail is $3^1/_4$ inches (82 mm) wide at the top and $2^1/_4$ inches (57 mm) wide at the bottom, and has a total depth of $3^3/_4$ inches (95 mm) and a wall thickness of 0.125 inch (3.2 mm). The rectangular bottom rail is 2 inches (50.8 mm) wide at top and bottom, and has a depth of $3^1/_2$ inches (89 mm) and a wall thickness of 0.14 inch (3.6 mm). Both top and bottom rails are available in 6-foot, 8-foot and 10-foot (1.83, 2.44 and 3.05 m) lengths.

The balusters are hollow, injection-molded spindles and square, co-extruded hollow pickets. The spindles are $1^1/_2$ inches (38.1 mm) square at the top and bottom and are used only for the 36-inch-high (914 mm) system. The pickets are $1^1/_2$ inches (38.1 mm) square. When the pickets are installed in the rails, there is a clear space of approximately $3^3/_4$ inches (95 mm) between pickets.

The post sleeves are 4 inches (102 mm) square and have a wall thickness of 0.186 inch (4.7 mm). See Figure 1 for dimensioned profiles of the post sleeves, top and bottom rails, top rail aluminum inserts and synthetic inserts, and balusters. The top rail mounting brackets are made from galvanized steel and the bottom rail mounting bracket is made from molded plastic. The 10-foot (3.05 m) rail systems utilize two intermediate bottom rail supports (located at the one-third point), while the 8-foot and 6-foot (2.44 m and 1.83 m) rail systems utilize one intermediate bottom rail support located at the midspan.

3.3 Durability:

When subjected to weathering, insect attack, and other decaying elements, the material used to manufacture the Quickrail™ Synthetic Railing System is equivalent in durability to code-complying, preservative-treated or naturally durable lumber when used in locations described in Section 2.0 of this report. The Quickrail™ Synthetic Railing System has been evaluated for structural performance when exposed to temperatures from −20º (−29ºC) to 125ºF (52ºC).

3.4 Surface-burning Characteristics:

When tested in accordance with ASTM E 84, the Quickrail™ Synthetic Railing System PVC has a flame-spread index of no greater than 200.

4.0 DESIGN AND INSTALLATION

4.1 General:

Installation of the Quickrail™ Synthetic Railing System must comply with this report and the manufacturer's published installation instructions. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.

4.2 Design:

The Quickrail™ Synthetic Railing System is satisfactory to resist the loads specified in Section 1607.7.1 of the IBC and Table R301.5 of the IRC, when installed at a maximum 10-foot (3.05 m), inside-to-inside post spacing. When the railing is supported on one or both ends by the supporting construction, the maximum distance must be measured from edge-of-post to edge-of-structure or from edge-of-structure to edge-of-structure. See Table 1 for actual measurement of rail and maximum spans.

4.3 Installation:

4.3.1 Quickrail™ Synthetic Railing System Post Sleeves: The Quickrail™ Synthetic Railing System must be fastened to posts or a structure that comply with the applicable code.

4.3.2 Quickrail™ Synthetic Railing System: The Quickrail™ Synthetic Railing System is a 6-, 8- and 10-foot-long (1.83, 2.44 and 3.05 m) assembly in which the top rail is a hollow T-section and the bottom rail is a hollow, 2-inch-by-$3^1/_2$-inch (51 by 89 mm), rectangular member. The assembly has aluminum or synthetic inserts in the top rail only or no insert at all. The top rails are attached to a post and sleeve, rigid column or building wall with a galvanized steel bracket secured with six No. 10 by $2^1/_2$-inch-long, (64 mm), stainless steel flat-head wood screws on a level rail and four No. 10 by $2^1/_2$-inch-long, (64 mm), stainless steel flat-head wood screws for a stair rail. The top bracket is secured to the top rail with two No. 8 by $^3/_4$-inch-long (19 mm) screws on any rail over 6 feet (1.83 m) long, or four No. 8 by $^3/_4$-inch-long, (19 mm) screws on rails 6 feet (1.83 m) long. Six-foot-long (1.83 m) top rails do not have an insert. Top rails over 6 feet (1.83 m) long, and up to 8 feet (2.44 m) long, have a synthetic insert. Top rails over 8 feet (2.44 m) long, and up to 10 feet (3.05 m) long, have an aluminum insert. All bottom rails are attached to a post and sleeve, rigid column or building wall with a plastic socket bracket secured with four No. 10 by $2^1/_2$-inch-long (64 mm), stainless steel, pan head wood screws. The bottom rail and socket bracket are installed as a slip-on fit without screws between the rail and the bracket. The balusters are pickets $1^1/_2$ inches (38 mm) square for all 42-inch-high (1067 mm) rail systems, and either $1^1/_2$-inch (38 mm) square pickets or $1^1/_2$-inch (38 mm) molded spindles, and are spaced $3^3/_4$ inches (92 mm) apart (open clear space). The top and bottom rails are routed to accept the pickets with no further attachment.

5.0 CONDITIONS OF USE

The Quickrail™ Synthetic Railing System described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 This product is limited to exterior use as a guardrail system for balconies, porches, decks and stairs used in exterior applications in Group R Occupancies (residential) in buildings of Type V-B (IBC) construction and other types of construction in applications where untreated wood is permitted by IBC Section 1406.3 or in buildings constructed in accordance with the IRC.

5.2 Installation must comply with this report, the manufacturer's published installation instructions and the applicable code. When the manufacturer's published installation instructions differ from this report, this report governs.

5.3 The compatibility of the fasteners, metal mount components and other metal hardware with the supporting construction, including chemically treated wood, is outside the scope of this report.

5.4 The Quickrail™ Synthetic Railing System must be directly fastened to supporting construction having adequate strength and stiffness. Where required by the code official, engineering calculations and construction documents consistent with this report must be submitted for approval. The calculations must verify that the supporting construction complies with the applicable building code requirements and is adequate to resist the loads imparted upon it from the products and systems discussed in this report. The documents must contain details of the attachment to the supporting structure consistent with the requirements of this report. The documents must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.5 The top rail component of the Quickrail™ Synthetic Railing System must not be used as a handrail for stairways or ramps.

5.6 The use of wood posts, with or without post sleeves, is outside the scope of this report.

5.7 The Quickrail™ Synthetic Railing System is produced in Archbold, Ohio, under a quality control program with inspections by Architectural Testing, Inc. (AA-676).

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails) (AC174), dated February 2007.

7.0 IDENTIFICATION

The Quickrail™ Synthetic Railing System described in this report is identified by a stamp, on each individual piece or on the packaging, bearing the manufacturer's name (Fypon), the product name, the name of the inspection agency (Architectural Testing, Inc.), and the ICC-ES evaluation report number (ESR-2601).

TABLE 1—MAXIMUM GUARDRAIL SYSTEM SPANS[1]

PRODUCT NAME/COMPONENT[5]	APPLICABLE BUILDING CODE[2]		MAXIMUM SPAN[3,4] (ft.-in.)
	IBC	IRC	
QuickRail™ 42 inches high with aluminum insert	Yes	Yes	10 - 0
QuickRail™ 42 inches high with synthetic insert	Yes	Yes	8 - 0
QuickRail™ 42 inches high with no insert	Yes	Yes	6 - 0
QuickRail™ 36 inches high with aluminum insert	--	Yes	10 - 0
QuickRail™ 36 inches high with synthetic insert	--	Yes	8 - 0
QuickRail™ 36 inches high with no insert	--	Yes	6 - 0

For **SI:** 1 inch = 25.4 mm, 1 foot = 305 mm.

[1]The ability of the supporting construction to resist the reactionary loads must be justified to the satisfaction of the code official.
[2]Indicates compliance with the respective building codes.
[3]Maximum span is measured from edge-of-post to edge-of-post.
[4]Maximum allowable span has been adjusted for durability. No further increases are permitted.
[6]The minimum height of the top rail is 42 inches for the IBC (Section 1013.2) and 36 inches for the IRC (Section R312).

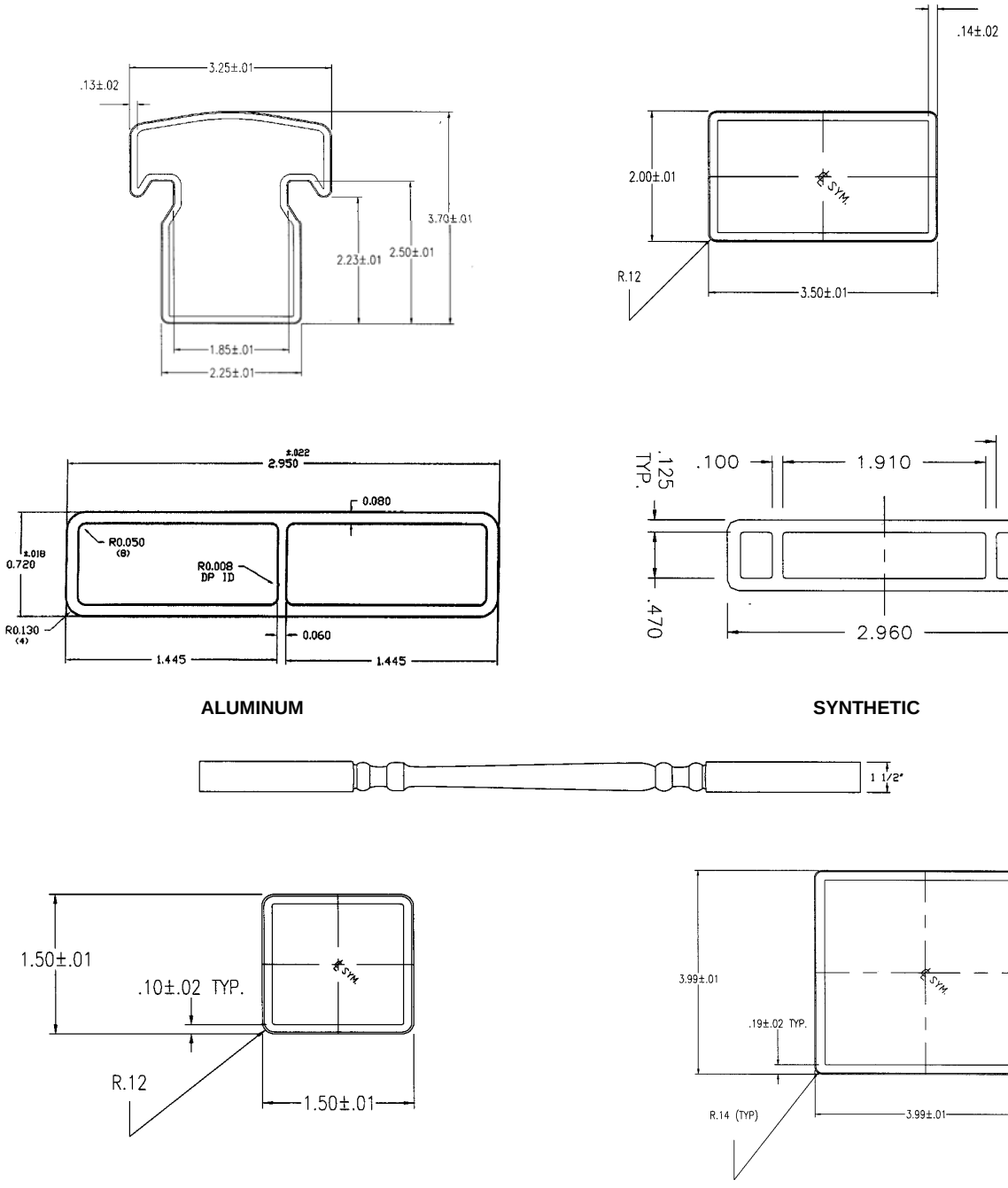
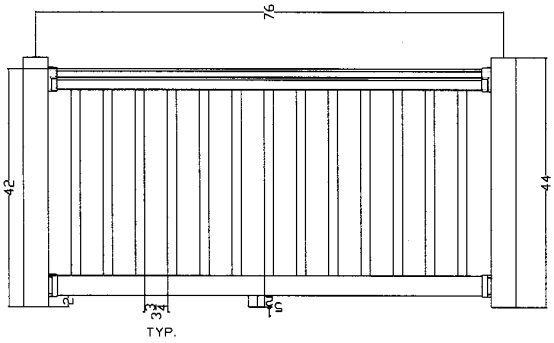
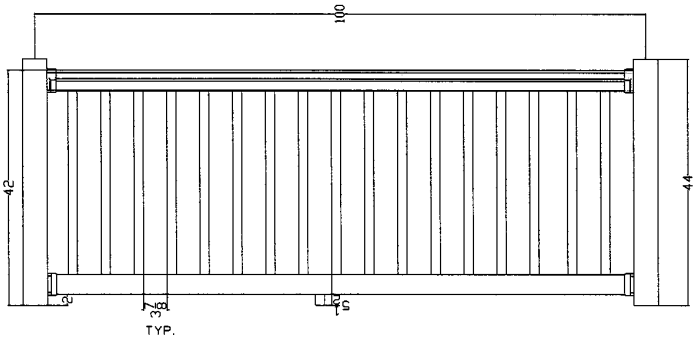


FIGURE 1—CROSS SECTIONS

72″ by 42″ QuickRail™



96″ by 42″ QuickRail™



120″ by 42″ QuickRail™

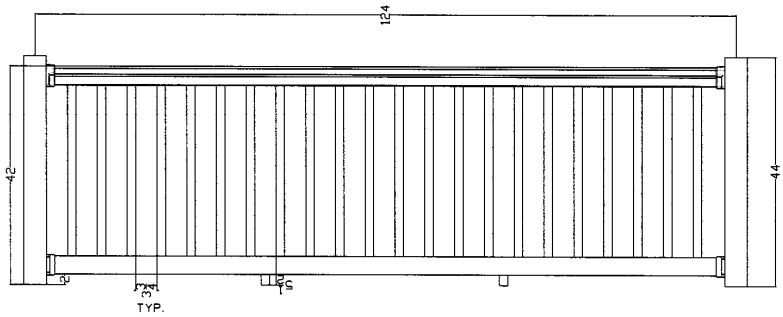


FIGURE 2—ASSEMBLIES