



# PFS TECO Research Report 0113

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**TYPE OF ACCEPTANCE:** Product Material – Wood and Plastics  
CSI Specification Division 065000 (Structural Plastic) and 066300 (Plastic Railing)

**MANUFACTURER IDENTIFICATION:** Barrette Outdoor Living  
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**RESEARCH REPORT SUBJECT:** Guardrail Systems for Exterior Applications Installation on construction complying with International Residential Code (IRC) Dwellings or complying with International Building Code (IBC) and International Building Code (IBC) Exceptions in Section 1015.3 of the International Building Code.

## **DESCRIPTION OF BUILDING COMPONENTS:**

Barrette Outdoor Living guardrail system is identified by the name – ***Transform (Guardrail) System***. The guardrail system is for use in areas as referenced in the Applicable Code Sections of this report. The guardrail system provides a protective barrier for walking areas, balconies, porches, stairs and ramps. The guardrail system is manufactured by the co-extrusion process, assembled with molded components and is produced in the colors Satin White, Wheat, Ironstone and Caramel.

### **1. Guardrail – *Transform***

- (a) The ***Transform*** guardrail system consists of top rail, bottom rail, balusters and reinforcing stiffener inserts. The top rail, bottom rail, stiffener inserts, and balusters are manufactured with PVC (**Resalite™** Composite) material by the co-extrusion process except for the aluminum baluster and the molded brackets.
- (b) The ***Transform*** guardrail system has a top rail that comes in three styles: Aspire, Presence and Emerge. The top rails have a highly-contoured configuration, hollow in the center, have rounded edges and has an acrylic cap stock on the rails. The three top rails may have reinforcing stiffener inserts depending on the guardrail span. When a stiffener is required there is one stiffener design for both the Aspire and Presences top rails and one stiffener design for the Emerge top rail. The top rails have a U-shape profile sub-rail and is pre-routed for baluster connectors. There is a graspable top rail design that is only used for stair applications (see “2. Stairs” below). See Table 1 in this report for drawings and dimensions of top rails, stiffeners and sub rail. See Table 2 for top rail stiffener installation requirements.
- (c) The ***Transform*** guardrail system has a bottom rail that has a highly-contoured configuration with an attaching sub-rail, has rounded edges and is pre-routed for balusters. The bottom rail sub-rail has a U-shape profile. See Table 1 in this report for drawings and dimensions of the bottom rail and sub-rail.
- (d) The ***Transform*** guardrail system has two optional baluster designs as follows: square and round. The square baluster is manufactured with PVC material, square in shape, has rounded edges and is hollow in the center. The round baluster is circular in shape, is hollow in the center and is an extruded 6063-T52 Aluminum material. See Table 1 in this report for baluster drawings and dimensions.
- (e) The ***Transform*** guardrail system connections for the top and bottom rail to the supports are PVC molded brackets. The brackets are secured to the posts with steel screws (stainless, corrosion resistant, or galvanized) suitable for use in preservative treated wood. See Table 1 of this report for drawing of the bracket and number of fasteners required.
- (f) The ***Transform*** guardrail system connections for the balusters to the top and bottom rail are as follows: a PVC adaptor for the square shape baluster and a die cast Aluminum adaptor that is circular in shape for the Aluminum baluster. See Table 1 of this report for a drawing of the adaptors.

- (g) See Table 2 in this report for the **Transform** guardrail system heights and lengths. The guardrail system that is 6 feet in length requires intermediate support under the bottom rail between the main supports and the guardrail system that is 8 feet in length requires two supports that are located under the bottom rail and are evenly spaced between the main supports.
- (h) See manufacturer's published installation instructions BOM 34107230 dated 8-15 for additional installation details.

**2. Stairs – Transform**

- (a) The **Transform** guardrail system can be used as stair guards. The top rail has a highly-contoured configuration, hollow in the center, have rounded edges and have an acrylic cap stock on the rail. The top rail has an attached U-shape profile sub-rail that is pre-routed for baluster connectors. See Tables 1, 2 and 3 in this report for the stair top and bottom rail, for sub-rail, for stair maximum length between posts, bottom rail supports, top and bottom rail connection brackets and fasteners required.
- (b) When the guardrail is used with stairs, the guardrail must be installed in accordance with the manufacturer's published installation instructions, noted in (c) below and in accordance with information located in Tables 1, 2 and 3 in this report. When the manufacturer's published installation instructions differ from this report, this report governs. In order to comply with the IBC or IRC graspability requirements, the graspable handrail must be provided. Specific details regarding the construction installation and attachment of the graspable handrail to the stair guardrail and/or posts have not been evaluated and are outside the scope of this research report. Specific details when required must be furnished to the authority having jurisdiction.
- (c) See manufacturer's published installation instructions BOM 34102251 dated 1-14-15 for additional installation details.

**3. Posts – Transform**

- (a) The **Transform** guardrail system has post sleeves and post sleeve spacer. The post sleeves are manufactured with PVC material, are square in shape, hollow in the center and have rounded edges. The post sleeves are non-structural and can be installed over conventional wood posts. The post sleeve spacer is manufactured with HDPE material, is square in shape, hollow in the center and has rounded edges. Specific details regarding the construction installation for the post sleeves, post sleeve spacer and/or posts have not been evaluated and are outside the scope of this research report. Specific details when required must be furnished to the authority having jurisdiction. See Table 1 of this report for post sleeve and post sleeve spacer drawings and dimensions.

**APPLICABLE CODES:**

- 2015 *International Building Code*® (IBC)
- 2012 *International Building Code*® (IBC)
- 2009 *International Building Code*® (IBC)
- 2006 *International Building Code*® (IBC)
- 2015 *International Residential Code*® (IRC)
- 2012 *International Residential Code*® (IRC)
- 2009 *International Residential Code*® (IRC)
- 2006 *International Residential Code*® (IRC)

**APPLICABLE CHARACTERISTICS REVIEWED:**

**1. Structural Performance:**

- (a) Barrette Outdoor Living **Transform** guardrail system has been reviewed for maximum spans as indicated in Table 2. Table 2 in this report also indicates the limitations of use evaluated for each design (style).

**2. Temperature:**

- (a) Barrette Outdoor Living **Transform** guardrail system has been reviewed for evaluated temperature range of -20 ° F (-29 °C) to 125 °F (52 °C).

**3. Flame Spread Index:**

- (a) Barrette Outdoor Living **Transform** guardrail system flame spread rating was less than 200 for **Resalite™ and PVC material** when tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*.

**4. Decay Resistance:**

- (a) The material used in the Barrette Outdoor Living **Transform** guardrail system in this report does not contain any wood and has been deemed comparable to naturally resistant wood or to preservative treated wood for resistance to fungal decay.

**5. Termite Resistance:**

- (a) The material used in the Barrette Outdoor Living **Transform** guardrail system in this report does not contain any wood and has been deemed equivalent to naturally resistant wood or to preservative treated wood for resistance to termite attack.

**6. UV Testing:**

- (a) The UV testing was conducted, and an appropriate adjustment factor was applied in accordance with ASTM D 7032-10, *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)*.

**7. Fastening:**

- (a) Barrette Outdoor Living **Transform** guardrail system top and bottom rails must be fastened to posts with brackets using steel (stainless, corrosion resistant or galvanized) screws. See Table 3 in this report and manufacturer's published installation instructions, noted in 1(h) above.
- (b) Barrette Outdoor Living **Transform** guardrail system stair top and bottom rails must be fastened to posts with PVC molded brackets using steel (stainless, corrosion resistant or galvanized) screws. See Table 3 in this report and manufacturer's published installation instructions noted in 2(c) above.
- (c) The fasteners and brackets are supplied by the manufacturer and must be used in the installation of the Barrette Outdoor Living guardrail system. Use of other brackets and fasteners is not covered under this report. See manufacturer's published installation instruction noted in 1(h) and 2(c) above.

**8. Posts:**

- (a) Wood posts or other wood support framing members supporting the posts are not covered under this report and fall outside of this report. Wood posts and other wood must be designed to meet the load requirement in the applicable building code and the wood members must have a minimum specific gravity of 0.50 (southern yellow pine or better) and a minimum thickness to allow full penetration of bracket mounting screws. Other wood posts or wood members not meeting these requirements are not covered under this report.

**APPLICABLE USES:**

The Barrette Outdoor Living **Transform** guardrail system evaluated in this report is for installations on construction complying with IRC or IBC. See Table 2 for guardrail systems limitations.

**LIMITATIONS OF ACCEPTANCE:**

The Barrette Outdoor Living **Transform** guardrail system described in this report complies with those codes listed in the Applicable Codes section above and are subject to the following conditions:

1. Barrette Outdoor Living **Transform** guardrail system is limited to exterior construction complying with the IRC and the IBC. The guardrail system provides a protective barrier for walking areas, balconies, porches, stairs and ramps.
2. Installation of the guardrail system must comply with this report; the manufacturer's published installation instructions identified as BOM 34107230 dated 8-15 and the applicable code. Installation of the guardrail stair system must comply with this report: the manufacturer's published installation instructions BOM 34107251 dated 1-14-15 and the applicable

code. When the guardrail installation instructions or the guardrail stair instructions differ from this report, this report governs.

3. The fasteners described in this report have been evaluated for the installation of the Barrette Outdoor Living **Transform** guardrail and handrail only. Structural wood posts and framing support members for posts must be designed to satisfy load requirements (live and dead) indicated in the applicable building code. Material necessary for anchorage of the guardrail system(s) and compatibility of the fasteners to the treated wood supporting construction have not been evaluated.
4. The Barrette Outdoor Living **Transform** guardrail system indicated in the report must be fastened to the supporting construction as indicated in the manufacturer's published installation instructions and as outlined in this report. When guardrail fastening instructions differ from this report, this report governs.
5. The Barrette Outdoor Living **Transform** guardrail Graspable design top rail component meets the graspability requirements when used as a handrail for stairs. See Description of Building Components 2(b) in this report for additional requirements.
6. When required, the guardrail system, including a stair rail system (see Description of Building Components 2(b)), in this report must be designed by a professional and submitted to the authority having jurisdiction for final acceptance.
7. The post sleeves for the **Transform** guardrail system are non-structural and can be installed over conventional wood posts. Wood posts have not been evaluated in this report and are not within the scope of this report.
8. The Barrette Outdoor Living **Transform** guardrail system has not been evaluated as a member of a fire-resistance-rated assembly.
9. Barrette Outdoor Living has Third Party inspection program provided by PFS Corporation (AA-652).

**DOCUMENTATION SUBMITTED:**

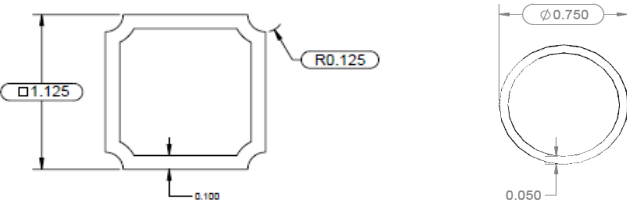
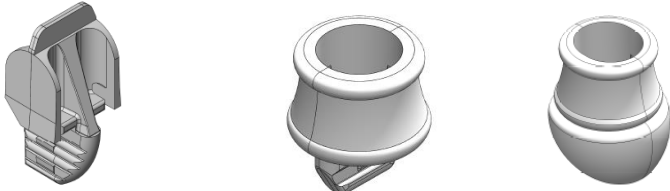
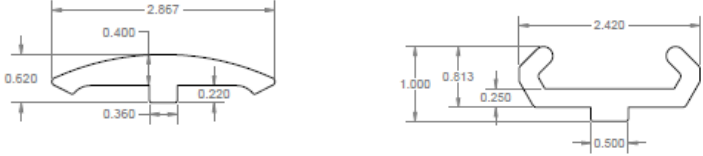
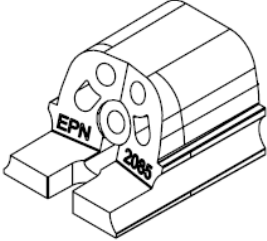
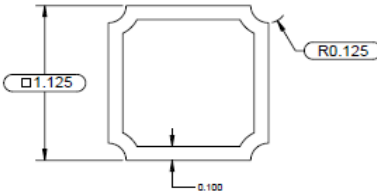
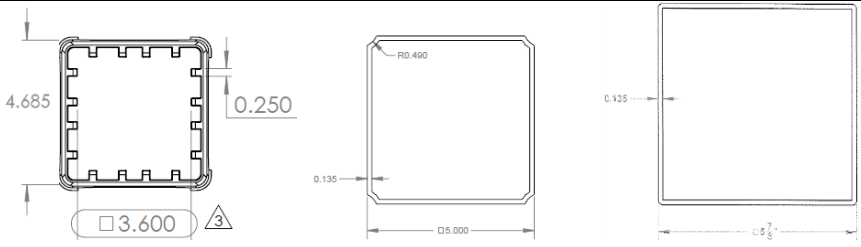
Submitted data was provided in accordance with PFS TECO 1601 (Quality Control Manual, Specifications, Manufacturer's published installation instructions, Test data and Descriptive information), and the product has been evaluated in accordance with ICC-ES AC174, *Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems*.

**PRODUCT IDENTIFICATION:**

The Barrette Outdoor Living guardrail assembly system must be identified with a label on each component or the packaging. The information required is as follows: Barrette Outdoor Living, product identification (**Transform**), compliance to ASTM D7032 including the maximum guardrail span and loading, the Research Report number (RR 0113), and the PFS Certification Mark. Guardrails that are 36" high require a label indicating, "Guardrail installation in residential (1 & 2 Family) units only." Guardrails without this information are not covered under this report.

Table 1: Schematics of Transform Guardrail System Components

Description	Profile
Top Rail	<p>The Top Rail section contains four schematic diagrams:</p> <ul style="list-style-type: none"> <li><b>Presence:</b> Shows a cross-section with a total width of 3.500 and a total height of 2.350. Internal dimensions include 1.590, 1.725, 0.180, and 1.375. A chamfered edge has a radius of R0.250.</li> <li><b>Emerge:</b> Shows a cross-section with a total width of 3.000 and a total height of 2.750. Internal dimensions include 0.250, 0.875, 0.583, 1.588, 1.725, and 2.480. Radii are R0.375 and R1.182.</li> <li><b>Aspire:</b> Shows a cross-section with a total width of 3.500 and a total height of 2.350. Internal dimensions include 1.590, 1.725, 0.180, and 1.375. A chamfered edge has a radius of R0.250.</li> <li><b>Grasable:</b> Shows a cross-section with a total width of 2.750 and a total height of 2.350. Internal dimensions include 0.350 and 0.200.</li> </ul>
Bottom Rail	<p>The Bottom Rail schematic shows a cross-section with a total width of 2.500 and a total height of 2.210. Internal dimensions include 0.150, 1.570, 1.710, and 0.180. A large radius of R3.000 is indicated.</p>
Sub Rail	<p>The Sub Rail schematic shows a cross-section with a total width of 1.750 and a total height of 1.315. Internal dimensions include 0.170, 0.140, and 1.705.</p>

Description	Profile
Balusters	 <p style="text-align: center;"><i>1-1/8" Square Resalite™</i>      <i>Round Aluminum</i></p>
Baluster Adaptors	 <p style="text-align: center;"><i>Square Baluster</i>      <i>Round Baluster-Level</i>      <i>Round Baluster-Stair</i></p>
Top Rail Insert	 <p style="text-align: center;"><i>Aspire/Presence</i>      <i>Emerge</i></p>
Bracket	
Bottom Rail Support Block	
Post Sleeve	 <p style="text-align: center;"><i>5x5" Post Sleeve</i>      <i>5x5" Post Sleeve</i>      <i>6x6" Post Sleeve</i></p>

**Table 2 Span Table for Transform Guardrail System**

<b>Guardrail Type</b>	<b>Top Rail</b>	<b>Top Rail Stiffener</b>	<b>Baluster</b>	<b>Max Guardrail Span</b>
<b>Maximum Guardrail Height 36 in. for IRC Residential One- and Two-Family Residential Dwellings</b>				
Level / In-Line Level / 45°	Presence	No	¾" Aluminum 1-1/8" Square Resalite™	96-in.
	Emerge			
	Aspire			
Stair	Presence	No	¾" Aluminum 1-1/8" Square Resalite™	92-in.
	Emerge			
	Aspire			
	Graspable	No	1-1/8" Square Resalite™	69-in.
<b>Maximum Guardrail Height 42 in. for IBC One- and Two-Family Residential Dwellings</b>				
Level / In-Line	Presence	Yes	¾" Aluminum 1-1/8" Square Resalite™	96-in
	Emerge			
	Aspire			
	Presence	No		91-in
	Emerge			
	Aspire			
Stair	Presence	No	72-in	
	Emerge			
	Aspire			

for SI conversion: 1 in = 25.4 mm, 1 psi = 47.9 Pa, 1 lbf = 0.0044 kN

Refer to Table 3 for fastening schedule

Maximum span is clear length between posts measured parallel to top/bottom rail

**Table 3: Fastening Schedule for Transform Guardrail Assembly**

<b>Location</b>	<b>Connection</b>	<b>Fasteners</b>
Top Rail	Bracket to Post	Three #10 x 2-1/2" pan-head, square drive, 410 SS 1000 h plated screw <sup>1</sup>
	Bracket to Sub Rail	One #6 x 3/4" trim-head, Philips drive, 18-8 SS screw
	Sub-Rail to Bracket to Rail-Cap	Two #10 x 2" pan-head, square drive, 410 SS 1000 h plated SS screw
	Baluster Adaptors to Rail	Slip Fit
	Baluster to Baluster Adaptors	Slip Fit
Bottom Rail	Bracket to Post	Three #10 x 2-1/2" pan-head, square drive, 410 SS1000 h plated screw <sup>1</sup>
	Bracket to Sub Rail	One #6 x 3/4" trim-head, Philips drive, 18-8 SS screw
	Sub-Rail to Bracket to Rail-Cap	Two #10 x 2" pan-head, square drive, 410 SS 1000 h plated screw
	Baluster Adaptors to Rail	Slip Fit
	Baluster to Baluster Adaptors	Slip Fit
	Rail to Support Block	One #12 x 5" trim-head, square drive, bugle head, 18-8 SS screw

<sup>1</sup> Pre drill with 1/4" drill bit