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## Legacy report on the BOCA® National Building Code/1999

### DIVISION: 06—WOOD AND PLASTICS

Section: 06500—Structural Plastics

Section: 06610—Plastic Railings and Guards

### REPORT HOLDER:

**TRIMAX BUILDING PRODUCTS**  
2600 WEST ROOSEVELT ROAD  
CHICAGO, ILLINOIS 60608  
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### EVALUATION SUBJECT:

**TRIMAX DECKING AND RAILING SYSTEMS**

### EVALUATION SCOPE

#### Compliance with the following code:

- Section 106.4 Alternative materials and equipment
- Section 1606.1 Uniform live load
- Section 1609.1.4 Uplift resistance
- Section 2305.14 Flooring
- Section 1021.2 Height
- Section 1021.3 Opening limitations
- Section 1606.4 Loads on handrails, guards, grab bars and vehicle barriers
- Section 1705.2 Inspection of fabricators
- Section 106.4 Alternative materials and equipment
- Section 1403.2 Durability

### DESCRIPTION

Trimax Decking and Railing System components are manufactured from recycled thermoplastic polymers which are extruded into solid plastic profiles. Trimax Decking and Railing System are used as flooring and guardrail systems for exterior balconies, porches, decks, and similar appendages on structures of combustible construction.

#### Trimax Decking

Trimax Decking is manufactured in 1-by-6, 2-by-6, and C-Deck profiles. The actual dimensions of the 2-by-6 profile are 1½-by-5½-inch. The 1-by-6 profile is manufactured with the actual dimensions of ¾-by-5½ and is available Square Edge or Groove

& Groove. The C-Deck profile has a C shape which is 5⅛-inch wide with a thickness of 1⅛-inch at the outer edges, and an inner thickness of ½-inch.

Trimax Decking is fastened to the supporting construction, as indicated in Table 1 of this report, by one of the following methods:

- Direct Method: Two, No. 10 flat-head screws, 2½-inch-long, at each joist (2-by-6 profile), or two, No. 8 flat-head screws, 1⅞-inch-long, at each joist (C-Deck and 1-by-6 profiles). The spacing between screws shall not be less than ½ of the decking board width. The edge distance shall not be less than ¼ of the decking board width. The end distance shall not be less than ¾-inch.
- Groove & Groove: One No. 7 flat-head screw, 1⅞-inch-long, fastened through a groove and groove clip at each joist. The polyethylene groove and groove clip is 2 inches long, 1⅞-inch-wide, and ⅞-inch-thick. The clip is placed between adjacent decking boards into the grooves that run the length of the decking boards. At the mid-point of the length of each deck board, toe-nail one No. 7 flat-head screw, 1⅞-inch-long, through the side of the decking board into a joist. See Figure 1 of this report.

See Table 1 of this report for the allowable spans for Trimax Decking.

#### Trimax Railing System

The Trimax Railing System is comprised of top and bottom rails, trim molding, vertical spindles, rail support blocks, rail clips, and nominal 4-by-4-inch posts. The system components are extruded plastic profiles, except for the rail clips which are 16 gage Type 304 steel, conforming to ASTM A666. The top and bottom rail, trim molding, and vertical spindles are fastened together into railing sections at the manufacturing plant. The rail support blocks are fastened to the railing section and the railing section is fastened to the posts at the jobsite. See Figure 2 of this report.

The railing sections are manufactured in nominal 4- and 6-foot-long assemblies. The railing sections can be trimmed to a length of 44½ inches for the nominal 4-foot-long assemblies and to a length of 68½ inches for the nominal 6-foot-long assemblies by cutting the top and bottom rails. Each spindle is fastened to the bottom rail with 1, #10, 2½-inch-long SS flathead screw, and to the trim molding with 1, #10, 2-inch-long SS flathead screw. The top rail is fastened to the trim molding with #10, 1⅞-inch-long SS flathead screws, 7 screws in the nominal 4-foot-long assembly, and 12 screws in the nominal 6-foot-long assembly. See Figures 3 and 4 of this report for the railing assemblies.

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## CONDITIONS OF USE

This report is limited to the applications and products as stated in this report. The ICC-ES Subcommittee on National Codes intends that the report be used by the code official to determine that the report subject complies with the code requirements specifically addressed, provided that this product is installed in accordance with the following conditions:

- Trimax Decking and Railing Systems shall be limited to use on the exterior of structures of combustible construction.
- Installation of the Trimax Decking and Railing Systems shall comply with this report and the manufacturer's installation instructions. Where manufacturer's instructions differ from this report, this report shall be null and void. Information within the manufacturer's instructions that is not specifically evaluated in this report is beyond the scope of this report.
- Trimax Decking and Railing Systems shall bear the label of PFS Corporation in accordance with the Quality and Manufacturing Procedures Manual, dated April 5, 1999.

### Trimax Railing System

- The Trimax Railing System nominal 4-by-4-inch posts shall be fastened to the supporting construction with one of the following:
  - Two,  $\frac{3}{8}$ -inch-diameter, 8-inch-long hex-head lag screws with  $\frac{3}{8}$ -inch SAE washers; or
  - Two,  $\frac{3}{8}$ -inch-diameter bolts with  $\frac{3}{8}$ -inch SAE washers.

The holes for the fasteners shall be located as indicated in Figure 2 of this report.

- The Trimax Railing System nominal 4-by-4-inch posts and rail support blocks shall be fastened to the railing assemblies in accordance with Figure 2 of this report.

### Trimax Decking System

- Allowable loads and spans for Trimax Decking shall be in accordance with Table 1 of this report. The maximum uniformly distributed uplift load shall be 35.7 psf.
- Adjacent Trimax Decking deck boards shall have a minimum space of  $\frac{1}{4}$ -inch-per-eight-feet of board length between board ends.
- This report is subject to periodic re-examination. For information on the current status of this report, contact the ICC-ES.

## ITEMS REQUIRING VERIFICATION

The following items are related to the installation of the report subject, but are not within the scope of this evaluation. These items are related to the determination of code compliance:

- U Construction documents indicating compliance with this report.
- U The design and construction of the supporting construction for Trimax Decking and Railing Systems.
- U The slip-resistance of the floor surface of Trimax Decking as required by Section 1005.4 of the BOCA<sup>®</sup> *National Building Code/1999*.

## INFORMATION SUBMITTED

- L.J. Broutman & Associates, Ltd., File 56-588, dated November 2, 1998, containing reports of testing of guardrail assemblies to the loading conditions in Section 4.4 of ASCE 7 *Minimum Design Loads for Buildings and Other Structures*. The results indicate that the guardrail assemblies in Figures 2, 3, and 4 of this report meet the structural requirements of the BOCA<sup>®</sup> *National Building Code/1999* for guardrail assemblies.

- L.J. Broutman & Associates, Ltd., File 56-633 and 56-706, dated January 19, 1999 containing reports of hygrothermal cycling, flatwise flexural, and bulk density testing. The results of the hygrothermal cycling and flexural testing are summarized in Table 2 of this report.

- Letter from M.G. McLaren, P.C. Consulting Engineers, signed and sealed by John P. Pensiero, P.E., dated February 2, 1999 containing hygrothermal cycling testing calculations. The calculations indicate that the flexural properties of the decking are reduced less than 10% after hygrothermal cycling testing.

- Underwriters Laboratories, Inc., Reference R18813, 98NK-14390, dated May 28, 1998, containing reports of fire testing of deck boards. See Table 2 of this report for a summary of the results.

- GeoLabs, Inc., Plastic Testing, Sample Numbers 74396-74398, dated December 11, 1998 containing reports of burn emission analysis and toxicity leaching testing. See Table 2 of this report for a summary of the results.

- Letters from M.G. McLaren, P.C. Consulting Engineers, signed and sealed by John P. Pensiero, P.E., dated February 11, 1999 and March 3, 1999 with attached calculations, dated January 7, 1999 and March 3, 1999 respectively, containing the basis for Table 1 of this report.

- L.J. Broutman & Associates, Ltd., File 20-757, dated November 3, 1998 containing reports of endwise compression, water absorption, and thermal expansion testing. The results of thermal expansion testing provide the basis for the spacing of the decking. See Table 2 of this report for a summary of the water absorption results.

- Test report, prepared by M.G. McLaren, P.C., signed and sealed by John P. Pensiero, P.E., dated May 1999, containing calculations to substantiate the fastening methods for the decking and further substantiation of Table 1 of this report.

- Bodycote Materials Testing, Broutman Laboratory, File 57-156, dated November 30, 1999 containing reports of flexural testing of the decking control samples and samples exposed to 1080 hours of accelerated weathering in accordance with ASTM D4329. The results indicate no loss in flexural strength and no change in physical appearance.

- Quality and Manufacturing Procedures Manual for the Trimax Building Products manufacturing plant located at 2600 West Roosevelt Road, Chicago, IL 60608, signed by representatives of Trimax Building Products and the third-party quality control agency, PFS Corporation.

## APPLICATION FOR PERMIT

To aid in the determination of code compliance with this report, the following represents the minimum level of information to accompany the application for permit:

- The language "See ICC-ES Legacy Report No. 97-63."
- Construction documents consistent with this report shall be provided with permit applications. The following items, at a minimum, shall be provided on the construction documents:
  - The manufacturer's decking member designation.
  - The on-center spacing of the supporting construction.
  - The design live load imposed on Trimax Decking.
  - Type and location of fasteners to secure Trimax Decking to the supporting construction.

- Calculations which address the ability of the supporting construction for Trimax Decking and Railing System to resist all imposed loads required by the BOCA® *National Building Code/1999*, without exceeding the allowable material stresses or specified strengths for the materials of construction.
- Additionally, Trimax Decking and Railing Systems shall bear a label that identifies the product and company name, manufacturing plant location or number, third-party inspection agency name or logo, and a means for establishing a date of manufacture.

## PRODUCT IDENTIFICATION

- Trimax Decking and Railing Systems manufactured in accordance with this report shall be marked at the plant with the identifying language "See ICC-ES Legacy Report No. 97-63."

**TABLE 1—ALLOWABLE SPANS FOR TRIMAX DECKING (INCHES)**

Trimax Decking Profile	Applied Load			Fastening System
	60 psf	100 psf	200 psf	
2 × 6	24	24	16	Direct Method
C-Deck	16	12	N.P.	Direct Method
1 × 6	12	N.P.	N.P.	Direct Method, or Groove & Groove

<sup>1</sup> Trimax Decking shall span a minimum of three joists.

<sup>2</sup> Allowable spans are based on a maximum temperature of 122 degrees F (50 degrees C).

<sup>3</sup> Maximum uniformly distributed uplift load shall be 35.7 psf.

<sup>4</sup> N.P. = Not permitted.

<sup>5</sup> 1 psf = 6.895 kPa; 1 in. = 25.4 mm

<sup>6</sup> For decking installed at a 45 degree angle to joist reduce joist spacing by 4 inches.

**TABLE 2—DURABILITY TEST REPORTS**

Test Description and Results	Test Facility and Report No.	Report Date
Hygrothermal cycling. Test samples were subjected to three cycles of water submersion, moisture absorption equilibrium, and freezing. The test samples were then subjected to flexural testing. The results indicate that the flexural properties of the test samples were reduced less than 10% when subjected to hygrothermal cycling testing. There were no deleterious physical effects.	L.J. Broutman & Associates, Ltd., File 56-633 and 56-706.	January 19, 1999
Flammability testing. Test samples were subjected to burning wood brands. The results indicate that flame did not readily propagate over the test samples.	Underwriters Laboratories, Inc., Reference R18813, 98NK14390.	May 28, 1998
Water absorption testing. Test samples were immersed in water for up to 11 weeks. The results indicate that the test samples absorbed a maximum of 0.17% by weight.	L.J. Broutman & Associates, Ltd., File 20-757	November 3, 1998
Burn Emission Analysis. An analysis of the smoke emissions were performed when test samples were burned. The results indicate that no toxic organics or polynuclear aromatic hydrocarbons were detected.	GeoLabs, Inc., Plastic Testing, Sample Numbers 74396-74398	December 11, 1998
Toxicity Leaching Testing. Test samples were immersed and agitated in an acid solution for 24 hours and then analyzed. The results indicate that no volatile or semi-volatile organics, polychlorinated biphenyl's, pesticides, or herbicides were detected.	GeoLabs, Inc., Plastic Testing, Sample Numbers 74396-74398	December 11, 1998

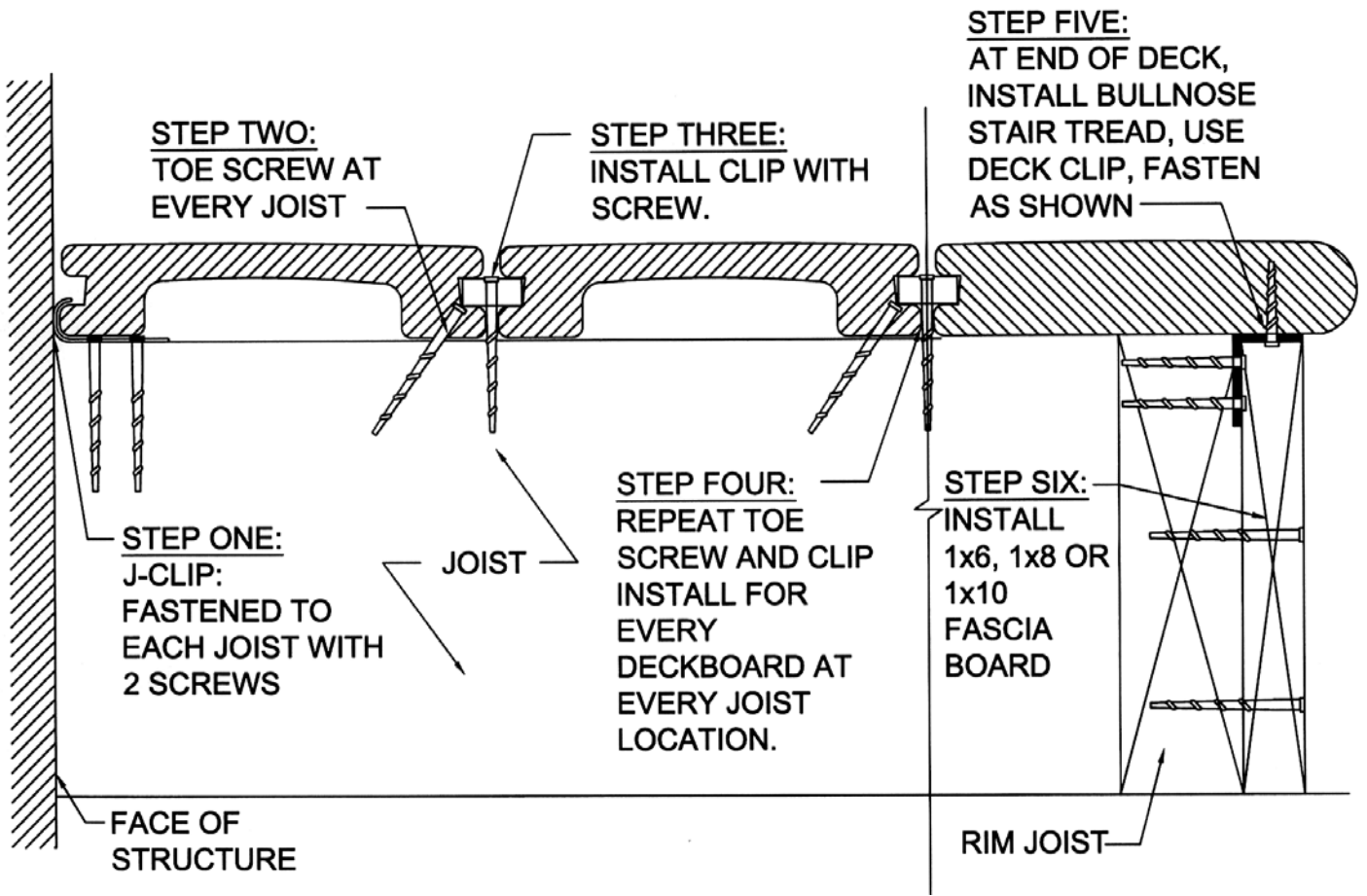


FIGURE 1—GROOVE & GROOVE SYSTEM

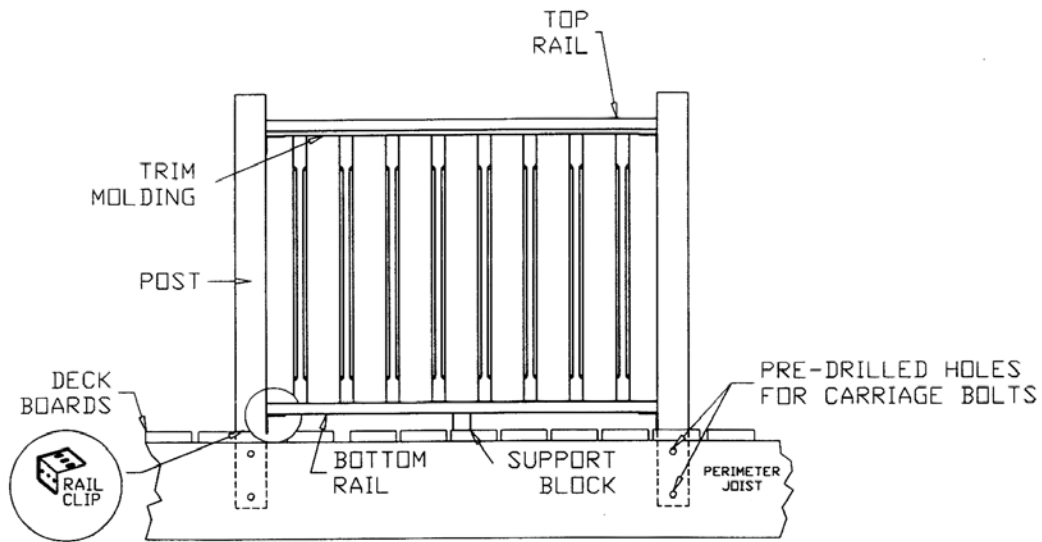


FIGURE 2—TRIMAX RAILING SYSTEM

**Notes to Figure 2:**

For SI: 1 inch = 25.4 mm.

<sup>1</sup> The rail support blocks shall be fastened to the bottom rail with 1 #10, 3-inch-long flat head screw.

<sup>2</sup> Each rail shall be connected to a nominal 4-by-4 post with one rail clip. The rail clip shall be fastened to the rail and the post with a total of 4 #10, 1 1/2-inch-long pan head screws. Two screws shall fasten the rail clip to the post, and two screws shall fasten the rail clip to the rail.

<sup>3</sup> Two holes for the 3/8-inch-diameter bolts or lag screws shall be located on the vertical center line of each 4-by-4-inch post, with the top hole located 1 1/4 inches from the top of the perimeter joist and the bottom hole 6 1/4 inches from the top of the perimeter joist.

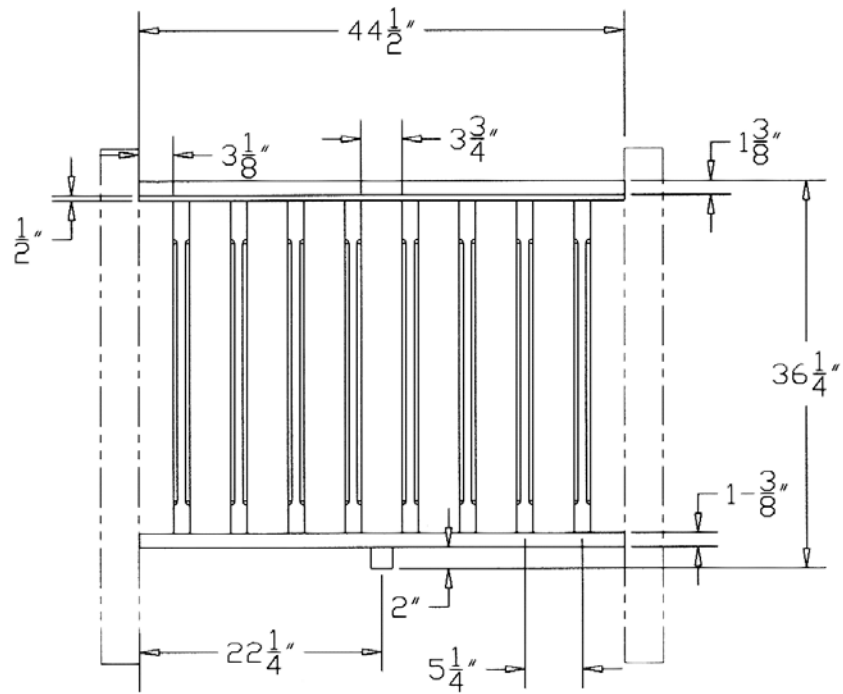


FIGURE 3—4 FOOT RAILING ASSEMBLY

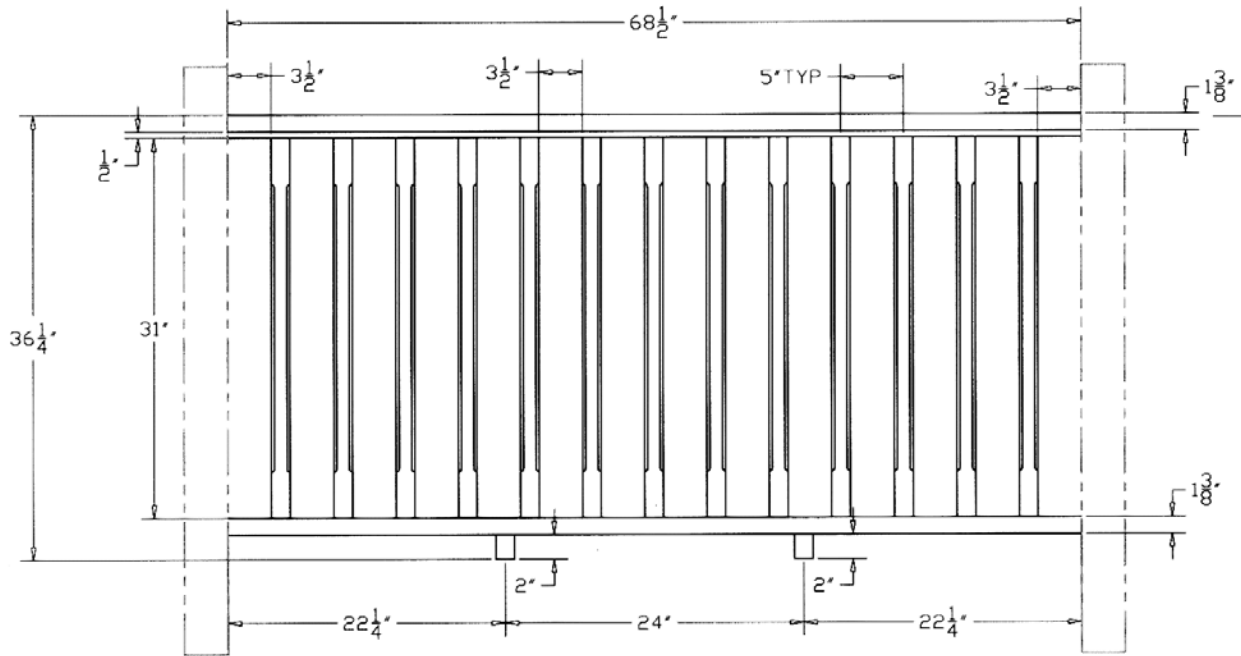


FIGURE 4—6 FOOT RAILING ASSEMBLY

**Notes to Figures 3 and 4:**

For SI: 1 inch = 25.4 mm.

<sup>1</sup> Dimensions are as-manufactured dimensions. Railings are permitted to be cut to a minimum length of 44 1/2 inches for Figure 3 and to a minimum length of 68 1/2 inches for Figure 4.

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