LEGACY REPORT

NER-605

Reissued April 1, 2004

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Legacy report on the 2000 *International Building Code*®, the 2000 *International Residential Code*®, the 1998 *International One-and Two-Family Dwelling Code*®, the BOCA® *National Building Code*/1999, the 1999 *Standard Building Code* and the 1997 *Uniform Building Code*™

DIVISION 06 — WOOD AND PLASTICS
Section 06500 — Structural Plastics
Section 06610 — Plastic Railings and Guards

CERTAINTEED CORPORATION –
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1.0 SUBJECT

1.1 CertainTeed PVC Deck Planks
1.2 CertainTeed PVC Railing Systems

2.0 PROPERTY FOR WHICH EVALUATION IS SOUGHT

Structural

3.0 DESCRIPTION

3.1 GENERAL

CertainTeed PVC Deck Planks and Railing Systems are manufactured from extruded polyvinyl chloride (PVC). Use of the planks and the railing systems is limited to unenclosed exterior decks, balconies, and porches and stair treads in buildings of combustible, nonfire-rated construction.

3.2 CERTAINTEED DECK PLANKS

CertainTeed planks are extruded PVC shapes, having overall nominal dimensions of $1^1/_2$ inches (height) by $5^1/_2$ inches (width) by varied lengths. The installed weight of the planks is 2.75 psf (0.13 kPa). Accessories for the planks include deck end covers and deck fill pieces for concealing fasteners.

3.2.1 Allowable Loads for the CertainTeed Deck Planks: Allowable vertical and uplift capacities of the CertainTeed planks are based on a maximum span of 24 inches (610 mm). The maximum uniform live load for the deck planks installed in accordance with this evaluation report is 100 psf(4.8 kN/m2), and the maximum uplift capacity is 83 psf (4.0 kN/m2). Deflections at design loads are less than or equal to L/240 of the allowable span. The use of deck planks to resist other than uniformly distributed gravity loads and wind uplift loads is beyond the scope of this evaluation report.

3.3 CERTAINTEED RAILING SYSTEMS

The CertainTeed Railing Systems include two models: Cambridge and Oxford. The models are available in straight sections for balconies and decks. The railing systems form guardrails having heights of 36 or 42 inches (914 or 1067 mm), and baluster spacing forms openings of less than 4 inches (102 mm). Each model includes extruded PVC rails, posts and balusters; U-shaped aluminum rail reinforcement members, and $1^5/_8$ inch diameter (41.3 mm) galvanized steel tube, manufactured from ASTM A 500 Pipe Carbon Steel Sch 40 & A36 Plate, having a yield and tensile strength of 50 ksi (344.74 MPa) and 60 ksi (413.69 MPa), respectively. The steel tube structural posts have an L-shaped bracket welded at one end. The bracket has four $^1/_2$ inch diameter (12.7 mm) holes for attaching the structural tube to the wood framed substructure using $^1/_2$ inch (12.7 mm) diameter through-bolts. A second attachment system is available for mounting the railing system to a concrete surface where a $^1/_4$ inch (6.35 mm) flat plat is welded to the bottom of the galvanized steel tube. The plate has four, $^5/_8$ inch (15.88 mm) diameter holes and is attached to the concrete using $^1/_2$ inch (12.70 mm) diameter anchors. A third attachment system is available for mounting the railing to a wall surface or porch post. The protruding part of the aluminum bracket is slid into the end of the top and bottom rails containing the aluminum U-Shaped inserts. Both brackets are then attached to the wall or porch post at the specified heights. The two side flanges of the bracket each containing three $^7/_{32}$ inch (5.56 mm) holes are attached to the wall or porch post with a minimum of two #10 x 2 inch (50.8 mm) long self tapping screws in each side a total of four screws per bracket. Refer to Table 1 for a list of system components.

3.3.1 Allowable Loads for the CertainTeed Railing Systems:
Rail systems described in this evaluation report are capable of supporting a load of 50 pounds per lineal foot (730 N/m) applied horizontally at right angles over the entire tributary area, including openings and spaces between rails and 200 pounds (2920 N) in any direction on the top rail.

3.4 Quality Assurance

Third party quality assurance is provided for CertainTeed PVC Deck Planks and Railing systems by Architectural Testing, Inc., IAS AA-676.

4.0 INSTALLATION

4.1 GENERAL

CertainTeed Deck Planks and Railing Systems shall be installed in accordance with the manufacturer's published installation instructions, approved building plans and this evaluation report.

The manufacturer's published installation instructions shall be made available to the code official upon request, and shall be available on the job site during construction. The instructions within this report govern if there are any conflicts between the manufacturer's published installation instructions and this report.

4.2 CERTAINTEED DECK PLANKS

The deck planks must be supported by minimum nominal 2 inch (51 mm) wide solid-sawn wood joists having a minimum specific gravity of 0.50, such as Douglas fir-larch. The maximum span of the planks is 16 inches (406 mm). When the planks are installed diagonally to the supporting joists, the spacing of the joists must be reduced such that the maximum allowable span of the plank is maintained. The supporting structural framing members must comply with code requirements for exposure to weather. The design of the structural framing supporting the planks must comply with the applicable building code.

CertainTeed Deck planks are also used as exterior stair treads on supporting framing with a maximum spacing of 12 inches (305 mm) on center.

Each plank is fastened to each supporting solid-sawn joist using two No. 8 wood screws that are a minimum of 2 inches (51 mm) long. A gap of $^1/_8$ inch (3.2 mm) shall be provided between each plank during installation. When butting two planks together, the butt joint shall be supported by a double joist The maximum overhang, from the edge of the substructure, for a plank is 4 inches (102 mm). Deck accessories, such as fill pieces, end covers and fascia boards are installed with the manufacturer's published installation instructions.

4.3 CERTAINTEED RAILING SYSTEMS

Maximum spacing of railing posts is 120 inches (3048 mm) when using "Heavy Duty" 0.140 inch (3.56 mm) thick side walls and 0.080 inch (2.03 mm) thick bottom wall U-Shaped inserts in top and bottom rails. Steel-tube posts with welded L-brackets are attached to solid-sawn lumber framing having a minimum nominal thickness of 2 inches (51 mm) and a minimum specific gravity of 0.50, such as Douglas fir-larch. Four $^1/_2$ inch diameter (12.7 mm) galvanized steel through bolts are used to attach the steel tube to the framing members. Refer to Figure 1 for a typical post spacing.

The PVC post covers are attached to the structural steel tube using two manufacturer-supplied brackets that are bolted to the steel tube. The top and bottom rails are reinforced with the aluminum members specified in Table 1 of this evaluation report, and are friction-fitted into the openings provided in the PVC post covering members. Before installation of the rails, the baluster members are friction-fitted into the openings provided in the rails. The top rail is attached to the steel post with a stainless steel top rail plate which fastens to the rail and aluminum rail insert with a #14 x 1 inch slotted hex head screw. Post caps and railing system accessories are installed in accordance with the manufacturer's published installation instructions. Refer to Figure 2 and Figure 3 for post installation details.

5.0 IDENTIFICATION

CertainTeed PVC Deck Planks and Railing Systems are identified by a label on the packaging noting the manufacturer's name (CertainTeed Corporation), the product name, the number of the quality assurance agency Architectural Testing, Inc., IAS AA-676, and this ICC-ES legacy evaluation report number, NER-605, for field identification.

6.0 EVIDENCE SUBMITTED

6.1 Reports of deck performance testing, prepared by Architectural Testing Inc., Report No. 01-34044.01, dated April 27, 1999.

6.2 Report of handrail performance testing, prepared by Architectural Testing Inc., Report No. 01-34044.03, dated May 3, 1999.

6.3 Report of structural load testing, prepared by Architectural testing Inc., Report No. 01.34044.04, dated May 3, 1999.

6.4 Nine drawings of components of the handrail and decking system; revision dated April 2002, September 2003, November 2003, December 2003, January 2004 and February 20-04.

6.5 Installation instruction for the CertainTeed decking system, dated April 1, 1998.

6.6 Installation instructions for the CertainTeed railing system, dated January 1999.

6.7 Test report load test of rail assemblies and PVC material tests, Architectural Testing Inc.,

6.7.1 Report No. 01-34816.03, 02/09/00, signed by Todd D. Burroughs and signed and sealed by Craig H. Wagner, P.E.

6.7.2 Wall mount bracket, Report No. 01-40561.02, 07/02.02, signed by Michael S. Ward, signed and sealed by Craig H. Wagner, P.E.

6.7.3 Oxford PVC 10 foot Guardrail System, Report No. 01-42743.01, 12/18/02, signed by Jason B. Bleecker, signed and sealed by Craig H. Wagner, P.E.

6.8 Test reports on fire characteristics of PVC, southwest Research Institute, signed by Alex B. Wenzel, and Anthony L. Sauceda:

6.8.1 Ignition properties ASTM D 1929, SwRI No. 01.03051.01.012, December 20, 1999.

6.8.2 Rate of burn ASTM D 635, SwRI No. 01.03048.01.037, December 22, 1999.

6.8.3 Surface burning characteristics ASTM E 84, SwRI No9. 01.03048.01.036, December 22, 1999.

6.9 Letter report on steel post fabrication, General Welding & Fabricating, Inc., March 27, 2000, Mark Andol.

6.10 Test Reports load tests of PVC deck and stair tread, Architectural Testing, Inc.;

6.10.1 Report No. 01-34044.05, 10/25/00, signed by Todd Burroughs and signed and sealed by Craig H. Wagner, P.E.

6.10.2 Report No. 01-34044.06, 01/24/01, signed by Joseph M. Brickner and signed and sealed by Craig H. Wagner, P.E.

6.11 Test report on coefficient of friction testing of decking under ASTM F 1679, Architectural Testing, Inc., Report No. 01-39794.01, 07/23/01, signed by Rodney E. Holland and Todd D. Burroughs.

6.12 Quality Control Manuals for Deck and Railing, CertainTeed Corporation, third party Architectural Testing, Inc., IAS AA-676;

6.12.1 Molded Products, McPherson, KS, Issued 2004.06.22.

6.12.2 Outdoor Products, Buffalo, NY, Issued 2004.06.02.

6.12.3 McPherson Extrusions, KS, Issued 2004.06.02.

7.0 CONDITIONS OF USE

The ICC-ES Subcommittee for the National Evaluation Service finds that the CertainTeed PVC Deck Planks and Railing Systems described in this evaluation report comply with or are suitable alternates to that specified in the 2000 *International Building Code*®, the 2000 *International Residential Code*®, the 1998 *International One-and Two-Family Dwelling Code*®, the BOCA® *National Building Code*/1999, the 1999 *Standard Building Code* and the 1997 *Uniform Building Code*™ subject to the following conditions:

7.1 The deck planks and railing systems are installed in accordance with this Evaluation Report and the manufacturer's published installation instructions.

7.2 The deck planks are used as structural flooring and stair treads for exterior balconies, decks, and porches in buildings that are combustible, non-fire-rated construction.

7.3 The railings shall not be used as parking guardrails in automobile parking garages.

7.4 Railing systems shall be attached to a substructure capable of supporting the horizontal and vertical loads resisted by the railing systems. Engineering calculations and building plans shall be submitted to the local code official for approval. The calculations shall verify that the supporting substructure complies with building code requirements, and the building plans shall show the method of attaching the railing system to the substructure and the location of railing posts. The individual preparing such documents shall possess the necessary credentials regarding competency and qualifications as required by the applicable code and the professional registration laws of the state where the construction is undertaken.

7.5 The static coefficient of friction of CertainTeed Deck Planks has been determined to be 0.70 (static dry), 0.65 (static wet) when tested in accordance with ASTM F 1679. The appropriateness of the determined static coefficient of friction, with respect to the requirement for slip-resistance in the applicable code is subject to the specific approval of the code official.

7.6 Contact CertainTeed Corporation for recommendations on galvanizing steel components of the CertainTeed Railing Systems that are in contact with preservative-pressure-treated wood.

7.7 This report is subject to periodic re-examination. For information on the current status of this report, contact the ICC-ES.

Table 1 - RAILING SYSTEM COMPONENTS

Model	Rail System Components	Description
Century Or Cambridge	Top & Bottom Rails	0.100 inch-thick extruded PVC shape, measuring 1-3/4 by 3-1/2 by 120 inches (also available in 95-1/2 and 71-1/2 inch lengths)
	Reinforcements Top and Bottom Rails	U-shaped aluminum member, 0.080 inch-thick bottom and 0.140 inch-thick sides by 119 inches in length for the 120 inch rail or 0.060 inch-thick aluminum U-shaped member measuring 1-1/2 x 3-1/4 x either 95 or 71 inches in length, depending on the length of the rail.
	Decorative Baluster	0.105 inch-thick molded PVC shape, measuring 1-1/4 by 1-1/4 by 33-1/4 inches (Also available in 39-1/4" length)
	Square Bluster	0.105 inch-thick extruded PVC shape, measuring 1-1/4 by 1-1/4 by 33-1/4 inches (Also available in 39-1/4" length)
	Post Covering	0.140 inch-thick extruded PVC shape, measuring 4 by 4 by 52 inches (also available in 38", 44" and 48" lengths)
	Post Support	0.150 inch-thick, 1-5/8 inch diameter galvanized steel tube, mounts to deck substructure or concrete surface
	Wall Mount Bracket	0.125 inch-thick by 2 inch high by 3 inch wide aluminum alloy bracket shape with 6 mounting holes

Model	Rail System Components	Description
Oxford Or Olympia	Top Rail	0.100 inch thick extruded PVC T-Rail shape, measuring 3 by 3-1/2 by 120 inches (also available in 95-1/2 and 71-1/2 inch lengths)
	Bottom Rail	0.100 inch-thick extruded PVC shape, measuring 1-3/4 by 3-1/2 by 120 inches (also available in 95-1/2 and 71-1/2 inch lengths)
	Reinforcements Top & Bottom Rails	U-shaped aluminum member, 0.080 inch-thick bottom and 0.140 inch-thick sides by 119 inches in length for the 120 inch rail or 0.060 inch-thick aluminum U-shaped member measuring 1-1/2 x 3-1/4 x either 95 or 71 inches in length, depending on the length of the rail.
	Decorative Baluster	0.105 inch-thick molded PVC shape, measuring 1-1/4 by 1-1/4 by 33-1/4 inches (Also available in 39-1/4" length)
	Square Bluster	0.105 inch-thick extruded PVC shape, measuring 1-1/4 by 1-1/4 by 33-1/4 inches (Also available in 39-1/4" length)
	Post Covering	0.140 inch-thick extruded PVC shape, measuring 4 by 4 by 52 inches (also available in 38", 44" and 48" lengths)
	Post Support	0.150 inch-thick, 1-5/8 inch diameter galvanized steel tube, mounts to deck substructure or concrete surface
	Wall Mount Bracket	0.125 inch-thick by 2 inch high by 3 inch wide aluminum alloy bracket shape with 6 mounting holes

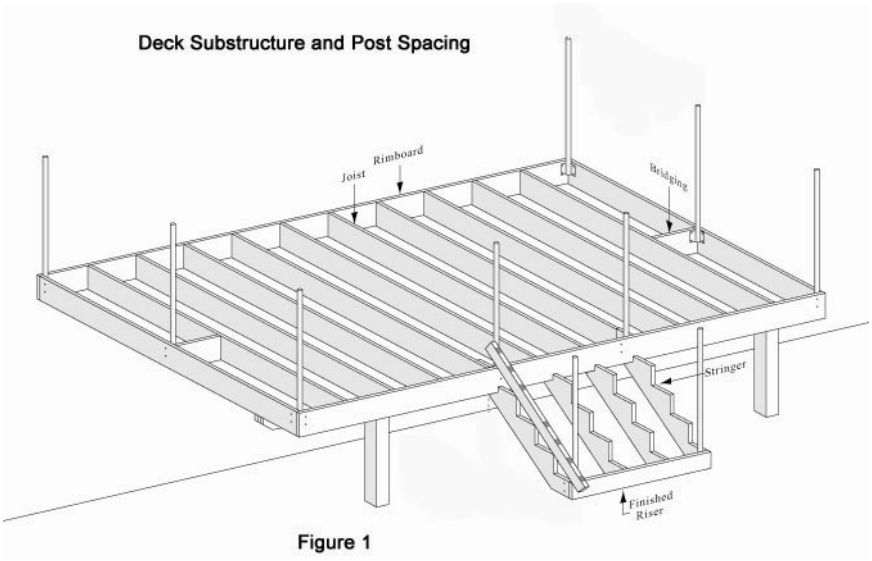

Figure 1

Deck Mount System

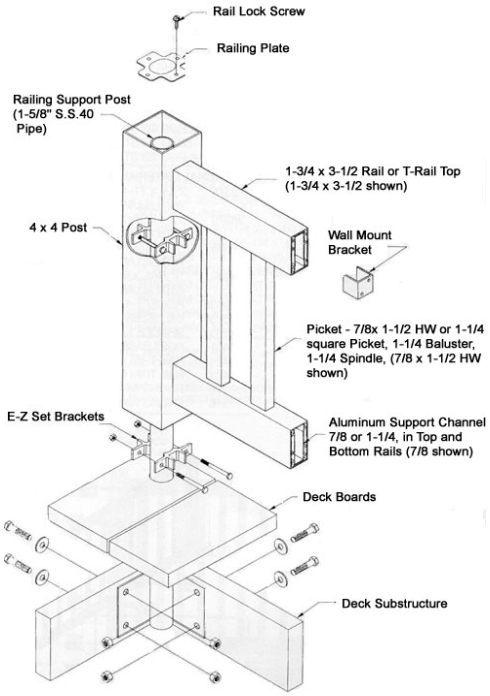

Figure 2

Concrete Mount System

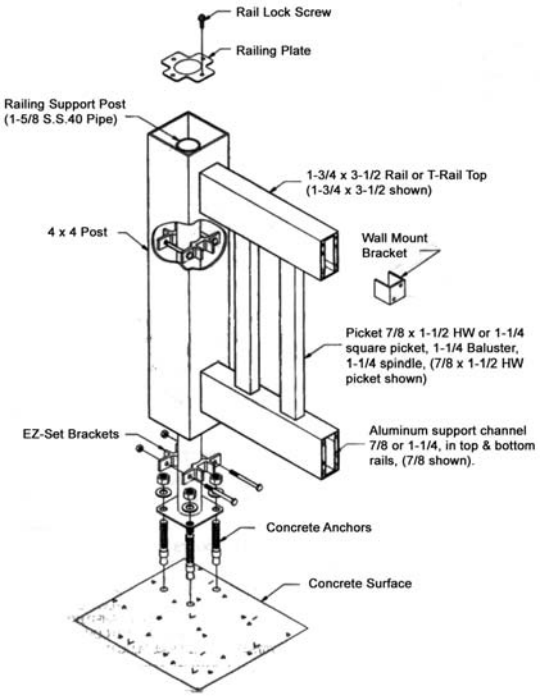

Figure 3