

# ICC-ES Legacy Report

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Legacy report on the 2000 *International Building Code*®, the BOCA® *National Building Code/1999*, the 1999 *Standard Building Code*®, the 1997 *Uniform Building Code*™, the 2000 *International Residential Code*®, the 2002 *Accumulative Supplement to the International Codes*™ and the 1998 *International One and Two Family Dwelling Code*®

## DIVISION 06 — WOOD AND PLASTICS Section 06160 — Sheathing

## DIVISION 07 — THERMAL AND MOISTURE PROTECTION Section 07450 — Fiber-Reinforced Cementitious Panels Section 07460 — Siding

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### 3.0 DESCRIPTION

#### 3.1 GENERAL

The exterior siding and soffit boards, interior lining and underlayment, and subfloor panels are single-faced, cellulose fiber-reinforced cement (fiber-cement) building boards. The Titan®-FR panel is a composite panel composed of a 1/8-inch-thick (3.2 mm) fiber-cement skin laminated to 1/2-inch-thick (12.7 mm) proprietary Type X gypsum board.

All fiber-cement planks and panels are produced from the same components and differ in surface treatments and board configurations. Exterior siding and soffit boards are identified as Hardiplank® (Hardihome™, Sentry™, Colonial Smooth®, Colonial Roughsawn®, Cemplank® and Hardishingle™), Hardiflex™, Hardipanel®, Cempanel®, Harditex® baseboard, Hardisoffit®, Cemsoffit® boards, Hardishingle™ panel and Hardishingle™ cladding shingles. Interior backerboards and underlayments are identified as Titan®, Hardibacker® (backerboard), Hardibacker® (underlayment), Ultraboard® and Titan®-FR panel. Subfloor panels are identified as Compressed Sheet. The planks, panels, and shingles are manufactured by the Hatschek process and cured by high-pressure steam autoclaving. All products are cut to shape on-site by the score-and-snap method using a tool available from the manufacturer, a hand guillotine or a handsaw utilizing a carbide blade.

The fiber-cement products have a flame-spread index of 0 and a smoke developed index of 5 when tested in accordance with ASTM E84. The products are classified as noncombustible when tested in accordance with ASTM E136. The siding and soffit products comply with ASTM C1186, *Standard Specification for Grade II, Type A, Non-Asbestos Fiber-Cement Flat Sheets*. The subfloor panels comply with ASTM C1186, *Standard Specification for Grade IV, Type A, Non-Asbestos Fiber-Cement Flat Sheets*. The interior lining products, Hardibacker® and Titan®, comply with ASTM C1288, *Standard Specification for Grade II Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets*. The interior lining product Hardibacker 500® complies with ASTM C1288, *Standard Specification for Grade I Discrete Non-Asbestos Fiber-Cement Interior*

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**Substrate Sheets.** All interior lining boards comply with ANSI A118.9 as cementitious backer units. When tested in accordance with ASTM C177, “K” and “R” values for the products are as shown in Table 4 of this report. When tested in accordance with ASTM E96, products with a thickness of 1/4-inch (6.4 mm) or greater have demonstrated the permeance values given in Table 5 of this report.

### 3.1.1 James Hardie Trade Names

Hardiplank®	Hardihome™
Cemplank®	Hardipanel®
Sentry™	Cempanel®
Colonial Smooth®	Hardiflex™
Colonial Woodgrain®	Harditex®
Hardisoffit®	Hardie®
Cemsoffit®	James Hardie®
Hardibacker®	Titan®-FR
Ultraboard®	Max “C”™
Titan®	Hardibacker 500®
Hardirock®	

### 3.2 SIDING AND SOFFIT BOARDS

Hardiplank®, Hardiflex™, Hardipanel®, Harditex® baseboard, Hardishingle™ planks and panels, Hardisingle™ cladding shingles, and Hardisoffit® boards are used as siding on exterior walls and soffits. The exterior siding and soffit products may be supplied unprimed or primed for subsequent application of a compatible primer and/or exterior-grade topcoat(s).

Nominal dimensions are noted in Table 1 of this report, maximum basic wind speeds in Tables 2a, 2b, 6, 7, 8, and 9 of this report, and maximum shear values in Table 3 of this report.

#### 3.2.1 Hardiplank® (Hardihome™, Sentry™, Colonial Smooth®, Colonial Roughsawn®, Hardishingle™ and Cemplank®) Lap Siding

**3.2.1.1 General:** Lap siding is available in various finish textures. The siding is applied horizontally commencing from the bottom course of a wall with minimum 1 1/4-inch-wide (32 mm) laps at the top edge. Vertical joints butt over studs except where the “off-stud splice device” is utilized as described in Section 3.2.1.2 of this report, or where the planks are installed over solid panel sheathing.

When installed on wood-framing members, the siding shall be fastened either through the overlapping planks (face nailed) or through the top edge of single planks (blind nailed) with corrosion-resistant nails into each wood-framing member. The lap conceals the fasteners in the previous course when blind nailed. When attached to metal framing members, the siding is fastened either through the overlapping planks with 1 5/8-inch-long (41 mm) No. 8 by 0.323-inch (8.2 mm) HD, self-drilling, corrosion-resistant, ribbed buglehead screws or with 0.100 in. (2.54 mm) shank by 0.25-in. (6.4 mm) HD by 1 1/2-in.-long (38 mm) ET & F brand pin fasteners at each metal framing member, or through the top edge of single planks with minimum 1 1/4-inch-long (32 mm) No. 8 by 0.375-inch (9.5 mm) HD, self-drilling, corrosion-resistant, ribbed waferhead screws or with 0.100 in. (2.54 mm) shank by 0.313 in. (7.5 mm) HD by 1 1/2 in.-long (38 mm) ET & F Panelfast® brand fasteners at each metal framing member. Planks may also be fastened to a wall constructed of concrete masonry units complying with ASTM C90 with 0.14 in. (3.5 mm)

shank by 0.300 in. (7.6 mm) HD by 1 1/4 in.-long (32 mm) ET & F brand Stud Nails. The lap conceals the fasteners in the previous course.

**Off-Stud Splice Device:** Vertical joints of the planks shall butt over framing members or between the framing members when an “off-stud splice device” is placed on each plank end. The splice device’s bottom lip is placed over the adjacent solid course of planks. The plank is then fastened to the framing. The abutting plank is positioned and fastened into place ensuring that the lower edges of the two planks align. The metal device is located centrally over the joint. Restrictions on the “off-stud splice device” locations are as follows:

Splices shall be located a minimum of two stud cavities from wall corners.

Successive splices within the same plank course shall be located no closer than 48 inches (1219 mm) from one another.

Splices shall be staggered at minimum 24-inch (610 mm) intervals when located in the same wall cavity.

Splices shall be at least one stud cavity away from door or window openings.

Where a specified level of wind resistance is required, plank lap siding shall be attached to solid panel sheathing or framing members, appropriately spaced, with fastener types, lengths, and spacing described in Tables 2b and 9 of this report.

#### 3.2.2 Hardiflex™ Siding (Hardipanel® Smooth)

Hardiflex™ siding is used as an exterior wall cladding. The siding has a smooth unsanded surface. Dimensions are as noted in Table 1 of this report. Fasteners are installed with a minimum 3/8-inch (9.5 mm) edge distance and a minimum 2-inch (51 mm) clearance from corners. Joints are fastened at abutting sheet edges and optionally protected by polyvinyl chloride (PVC) joint treatment, lumber battens or sealant.

Where a specified level of wind resistance or shear resistance is required, the Hardiflex™ panel is attached to framing members, appropriately spaced, with fastener types, lengths, and spacing described in Table 2a and Table 3 of this report.

#### 3.2.3 Hardipanel® Siding (Cemplank® Siding)

Hardipanel® siding is available in various surface textures including smooth. Dimensions are noted in Table 1 of this report. Fasteners are installed with a minimum 3/8-inch (9.5 mm) edge distance and a minimum 2-inch (51 mm) clearance from corners. Joints are fastened at abutting sheet edges and optionally covered by polyvinyl chloride (PVC) joint treatment, lumber battens or sealant.

Where a specified level of wind resistance or shear resistance is required, the Hardipanel® siding is attached to framing members, appropriately spaced, with fastener types, lengths, and spacing described in Tables 2a and 3 of this report.

#### 3.2.4 Harditex® Baseboard

Harditex® baseboard is for exterior applications to walls and soffits. Dimensions are noted in Table 1 of this report. Harditex® baseboard has a smooth finish and is available with either tapered or trough edges on the two long sides for joint treatment or all square edges. Harditex® baseboard is supplied either sealed or unsealed for the subsequent application of a primer or sealer by the end user as a component in a direct-applied exterior coating or finish system. Joints shall be sealed with a sealant or bedding compound, including any required joint reinforcing

mesh or tape, specified by the coating manufacturer. Other installation details are in accordance with Section 3.2.2 of this report. Harditex<sup>®</sup> baseboard has been evaluated for water-resistive qualities but its use as an alternative to a weather-resistive barrier is outside the scope of this report, see Section 7.4 of this report.

Where a specified level of wind resistance or shear resistance is required, the Harditex<sup>®</sup> baseboard is attached to framing members, appropriately spaced, with fastener types, lengths, and spacing described in Table 2a or 3 of this report.

### 3.2.5 Hardisoffit<sup>®</sup> Board (Cemsoffit<sup>®</sup> Board)

Hardisoffit<sup>®</sup> board is for use as exterior vented or unvented soffits. Hardisoffit<sup>®</sup> board is available with either a wood-grain texture or a smooth unsanded surface. Vented Hardisoffit<sup>®</sup> provides 5 square inches of net free ventilation per lineal foot of soffit. Dimensions are noted in Table 1 of this report. All Hardisoffit<sup>®</sup> board edges are supported by framing with fasteners installed with a minimum  $\frac{3}{8}$ -inch (9.5 mm) edge distance and minimum 2-inch (51 mm) clearance from corners. Hardisoffit<sup>®</sup> boards are attached to framing members with fastener types, lengths, and spacings described in Tables 2a and 3 of this report.

### 3.2.6 Hardishingle<sup>™</sup> Cladding (individual shingles)

Hardishingle<sup>™</sup> cladding shall be installed over solid wall sheathing which complies with the applicable code. Dimensions are as noted in Table 1 of this report. The wall sheathing shall be protected by a weather-resistive barrier which complies with the applicable code.

When Hardishingle<sup>™</sup> cladding is installed over minimum  $\frac{15}{32}$ -inch-thick (11.9 mm) plywood complying with the applicable code, with two corrosion-resistant roofing nails [0.121-inch (3.1 mm) shank diameter by 0.371-inch (9.4 mm) head diameter by  $\frac{1}{4}$ -inch-long (32 mm)] spaced a maximum of 1 inch (25.4 mm) from each edge and the nails positioned to be covered 1 inch nominally by the succeeding course, the maximum allowable wind loads, building heights, and exposure categories for the systems installed with 8-, 7-, and 6-inch (203, 178, and 152 mm) weather exposures, shall be as indicated in Tables 6A, 6B, and 6C of this report. Nails shall secure siding but shall not be overdriven.

When Hardishingle<sup>™</sup> cladding is installed over minimum  $\frac{7}{16}$ -inch-thick (11.1 mm) Oriented Strand Board (OSB), complying with the applicable code, with two corrosion-resistant siding nails [0.091-inch (2.3 mm) shank diameter x 0.221-inch (5.5 mm) head diameter by  $\frac{1}{2}$ -inch-long (38 mm)] spaced a maximum of 1 inch (25.4 mm) from each edge and the nails positioned to be covered 1 inch nominally by the succeeding course, the maximum allowable wind loads, building heights, and exposure categories for the systems installed with 8-, 7-, and 6-inch (203, 178, and 152 mm) weather exposures, shall be as indicated in Tables 7A, 7B, and 7C of this report. Nails shall secure siding but shall not be overdriven.

When Hardishingle<sup>™</sup> cladding is installed over minimum  $\frac{7}{16}$ -inch-thick (11.1 mm) Oriented Strand Board (OSB), complying with the applicable code, with three corrosion-resistant siding nails [0.091-inch (2.3 mm) shank diameter x 0.221-inch (5.5 mm) head diameter by  $\frac{1}{2}$ -inch-long (38 mm)] for 12-inch-wide (305 mm) shingles and two corrosion-resistant siding nails for 6- and 8-inch-wide (152 mm and 203 mm) shingles, the maximum allowable wind loads, building heights, and exposure categories for the systems installed with 8-, 7-, and 6-inch (203, 178, and 152 mm) weather exposures, shall be as indicated in Tables 8A, 8B, and 8C of this report. One siding nail shall be spaced a maximum of 1 inch (25.4 mm) from each edge on the panel, with the third siding nail installed midspan of

the 12-inch (305 mm) wide shingles. All nails shall be covered 1 inch nominally by the succeeding course. Nails shall secure siding but shall not be overdriven.

### 3.2.7 Hardishingle<sup>™</sup> Panels

Hardishingle<sup>™</sup> panels have a woodgrain texture and are available in three configurations: half-round<sup>®</sup>, staggered-edge<sup>®</sup>, and square-edge<sup>®</sup>. Dimensions are as noted in Table 1 of this report. The siding is applied horizontally to braced wall framing complying with the applicable code commencing from the bottom course of a wall. Install Hardishingle<sup>™</sup> panels with joints in moderate contact. Due to the overlapping of the panels, joint sealant is not required. Fasteners are a minimum 0.083-inch (2.1 mm) shank x 0.187-inch (4.7 mm) HD by  $\frac{1}{2}$ -inch-long (33 mm) corrosion-resistant siding nail. For application to open braced framing, vertical joints butt over studs.

Where a specified level of wind resistance is required, Hardishingle<sup>™</sup> panel sidings are attached to framing members appropriately spaced or to solid wall sheathing, with fastener types, lengths, and spacing described in Table 2 of this report.

Secure a  $\frac{1}{4}$ -inch-thick (6.4 mm) lath strip and a minimum  $9\frac{1}{4}$ -inch-wide (235 mm) Hardiplank<sup>®</sup> lap siding starter course. Trim the first panel so the end aligns with the furthest stud. Allow trimmed panel  $\frac{1}{8}$  inch (3.2 mm) from the trim board for caulk and secure above keyways [approximately 8 inches (203 mm) clearance from butt edge of panel] on 16-inch (406 mm) or 24-inch (310 mm) centers [13 $\frac{3}{4}$ -inch (349 mm) centers maximum for application only to minimum  $\frac{7}{16}$ -inch-thick (11.1 mm) APA rated Oriented Strand Board sheathing]. Work across the wall allowing  $\frac{1}{8}$ -inch (3.2 mm) gap from trim.

Start the second course, and every following even number course (i.e. fourth, sixth) by moving the equivalent of one full stud cavity from the straight edge end (the left side). Save this piece for the other end of the wall. Secure the beginning panel leaving  $\frac{1}{8}$ -inch (3.2 mm) clearance from the trim board for caulking. Position nails to penetrate through the previous course and into the framing members or Oriented Strand Board.

When a course is broken by a window or doorway, continue the application as if the wall was complete. Trimming for the opening and using the resulting piece may throw off the spacing above the break.

### 3.2.8 Hardipanel<sup>®</sup> Shiplap Panel Siding

Hardipanel<sup>®</sup> Shiplap panel siding is used as an exterior wall cladding. The siding is available in various surface textures including smooth. Dimensions are noted in Table 1 of this report. Fasteners are installed with a minimum  $\frac{3}{8}$ -inch (9.5 mm) edge distance and a minimum 2-inch (51 mm) clearance from corners.

Where a specified level of wind resistance or shear resistance is required, the Shiplap panel siding is attached to framing members, appropriately spaced, with fastener types, lengths, and spacing described in Tables 2a and 3 of this report.

## 3.3 LINING BOARD AND UNDERLAYMENT

Titan<sup>®</sup> panel, Hardibacker<sup>®</sup> and Hardibacker 500<sup>®</sup> (ceramic tile backerboards), and Hardibacker<sup>®</sup> underlayment are used as wet or dry area lining/underlayment substrates applied to the interior of buildings. Titan<sup>®</sup>-FR (tapered-edge) panel is only intended for dry interior wall and ceiling applications.

### 3.3.1 Titan<sup>®</sup> Panel

Titan<sup>®</sup> panel is only intended for interior walls and ceilings including shower and bath areas. Subsequent finishing

using paint, wallpaper or tile is required as indicated in Sections 3.3.1.1 and 3.3.1.2 of this report. The panel has a smooth finish with tapered edges on the two long dimensions for joint treatment. Dimensions are noted in Table 1 of this report. Maximum shear values are noted in Table 3 of this report.

**3.3.1.1 Paint or Wallpaper Finish:** Titan<sup>®</sup> panel is installed with the long dimension either vertical or horizontal to nominal 2 x 4 wood framing members or minimum No. 20 gage (0.0329-inch) steel framing members, spaced a maximum of 24 inches (610 mm) on center with end joints staggered from adjacent courses in both vertical and horizontal applications. To fasten to wood framing members, minimum 1<sup>3</sup>/<sub>8</sub>-inch-long (35 mm) gypsum board nails or minimum 1-inch-long (25.4 mm) No. 8 x 0.323-inch (8.2 mm) HD self-drilling, corrosion-resistant, ribbed buglehead screws are used and spaced a maximum of 8 inches (203 mm) on center at all supports. To fasten to metal framing members, minimum 1-inch-long (25.4 mm) No. 8 x 0.323-inch (8.2 mm) HD self-drilling, corrosion-resistant, ribbed buglehead screws are used and spaced a maximum of 6 inches (152 mm) on center at all supports. Fasteners shall be located at least 3<sup>3</sup>/<sub>8</sub> inch (9.5 mm) from board edges, and 2 inches (51 mm), minimum, from lining board corners. Panels are placed with a minimum 1<sup>1</sup>/<sub>4</sub>-inch (6.4 mm) clearance from the floor surface. Metal or PVC corner angles are attached with the above described nails or screws placed approximately 12 inches (305 mm) on center.

A flush-joint procedure is permitted on Titan<sup>®</sup> panels. Gypsum board joint compounds, complying with ASTM C474 and C475, shall be troweled into the joints. Paper joint tape is embedded into the wet joint compound and allowed to dry thoroughly. A second coat of joint compound, approximately 8 inches (203 mm) wide, is then applied across the joint and allowed to dry. A third coat of topping compound, 10 inches (254 mm) wide, is applied across the joint. Topping compound shall also be applied over all fastener heads in intermediate locations.

Internal corners are finished by filling with joint compound, working the joint tape into the joint, and applying a second coat of joint compound. A third coat of topping compound is applied over the area.

External corners are treated by filling the joint with joint compound and allowing it to thoroughly dry. Corrosion-resistant metal or PVC corner angles are then fastened to the corner, followed by a second coat of joint compound. When the second coat is completely dry, a third coat of topping compound is applied over the area. Topping compound is also applied over all fastener heads in intermediate locations.

**3.3.1.2 Tile Finish:** Titan<sup>®</sup> panel is installed with the long dimension either vertical or horizontal to nominal 2 x 4 wood-framing members or minimum No. 20 gage (0.0329-inch, 0.84 mm) metal framing members spaced 24 inches (610 mm) on center, maximum, with end joints staggered from adjacent courses in both vertical and horizontal applications. To comply with ANSI A108.11, framing members are spaced 16 inches (406 mm) on center, maximum. To fasten to wood framing members, minimum 1<sup>1</sup>/<sub>4</sub>-inch-long (32 mm), corrosion-resistant (galvanized or stainless steel) roofing nails, or 1<sup>1</sup>/<sub>4</sub>-inch-long (32 mm) No. 8 x 0.375-inch (9.5 mm) HD self-drilling, corrosion-resistant, ribbed waferhead screws are used and spaced a maximum of 6 inches (152 mm) on center at all supports. To fasten to metal framing members, minimum 1<sup>1</sup>/<sub>4</sub>-inch-long (32 mm) No. 8 x 0.375-inch (9.5 mm) HD self-drilling, corrosion-resistant, ribbed waferhead screws are used and spaced a maximum of 6 inches (152 mm) on center at all supports. Fasteners are located at least

3<sup>3</sup>/<sub>8</sub> inch (9.5 mm) from board edges, and 2 inches (51 mm), minimum, from board corners. Corner gaps are filled with a flexible, silicone sealant compatible with fiber-cement. Panels are placed with a minimum 1<sup>1</sup>/<sub>4</sub>-inch (6.4 mm) clearance from the floor surface. This gap shall be free of adhesive and grout and filled with a flexible sealant. On large tiled areas, movement joints are provided in the walls in accordance with ANSI A108, Section AN-3.7.

A flush-joint procedure is permitted on Titan<sup>®</sup> panel. The same type of tile adhesive or mortar used to set the tiles shall be troweled into joints as a joint compound. Joints shall be reinforced with 2-inch (51 mm) wide, high-strength, coated, alkali-resistant, glass fiber reinforcing joint tape embedded into the wet tile adhesive and allowed to dry thoroughly.

Internal corners are finished by filling with tile adhesive, working the reinforcing joint tape into the joint, and applying a second coat of tile adhesive and allowing it to dry thoroughly.

External corners are treated by filling the joint with tile adhesive and allowing it to dry thoroughly. Corrosion-resistant metal or PVC corner angles are then fastened in place, followed by a second coat of tile adhesive. Tile adhesive is also applied over all fastener heads in intermediate locations.

Wall tiles complying with ANSI A137.1 are attached to the board with flexible Type I, mastic adhesives complying with ANSI A136.1, or acrylic or latex-modified thinset mortars complying with ANSI A118.4, in accordance with ANSI A108. The same adhesives are permitted to fill and level the sheet joints.

### 3.3.2 Hardibacker<sup>®</sup> and Hardibacker 500<sup>®</sup> (Ceramic Tile Backerboard)

Hardibacker<sup>®</sup> and Hardibacker 500<sup>®</sup> ceramic tile backerboards are only intended for interior walls and floors, including shower and bath areas (excluding the shower floor). Subsequent finishing with tile is required. The square-edge backerboards have a smooth-finished surface and square edges for closely butted joints. Dimensions are noted in Table 1 of this report. Maximum shear values are noted in Table 3 of this report.

Floors: When Hardibacker<sup>®</sup> or Hardibacker 500<sup>®</sup> backerboards are used on floors, the subfloor assembly shall consist of a minimum 5<sup>5</sup>/<sub>8</sub>-inch-thick (15.9 mm), Exterior Grade, Group 2 or 3 species plywood or equivalent thickness of subfloor and shall be designed such that the maximum deflection in a plane, including live and dead loads, is L/360 of the span, in accordance with the applicable code. Movement joints shall be provided where existing structural joints (building control joints) occur and where changes in direction occur such as in "L"-shaped rooms. For large tiled areas, movement joints are provided in accordance with ANSI A108, Section AN-3.7.

The subfloor is then covered with a minimum 3<sup>3</sup>/<sub>32</sub>-inch-thick (2.4 mm) latex, or acrylic-modified thinset setting material. The backerboard is then installed in a staggered brick pattern at right angles to the subfloor and fastened before the setting material films over.

The backerboards are fastened with 1<sup>1</sup>/<sub>4</sub>-inch-long (32 mm), corrosion-resistant (galvanized or stainless steel) roofing nails or minimum 1-inch-long (25.4 mm) No. 8 by 0.323-inch (8.2 mm) HD self-drilling, corrosion-resistant, ribbed buglehead screws. To meet the requirements of ANSI A108.11, minimum 1<sup>1</sup>/<sub>4</sub>-inch-long (32 mm) No. 8 x 0.375-inch (9.5 mm) HD self-drilling, corrosion-resistant ribbed waferhead screws are used. Fasteners shall be located a maximum of 8 inches (203 mm) on center around the perimeter and in the field. Fasteners shall be located a

minimum of  $\frac{3}{8}$  inch (9.5 mm) and a maximum of  $\frac{3}{4}$  inch (19.1 mm) from the backerboard edges, and 2 inches (51 mm) minimum, from underlayment corners. For latex or acrylic modified thinset mortars, the joints shall be reinforced with 2-inch-wide (51 mm), high-strength, coated, alkali-resistant, glass-fiber reinforcing tape embedded into the wet mortar and allowed to dry thoroughly.

Floor tiles complying with ANSI A137.1 are attached to the board with flexible Type I mastic adhesives complying with ANSI A136.1, or acrylic or latex-modified thinset mortars complying with ANSI A118.4, in accordance with ANSI A108. The same adhesives are also used to fill and level the sheet joints.

Walls: Hardibacker® and Hardibacker 500® backerboards are installed with the long dimension either vertical or horizontal to nominal 2 x 4 wood framing members or minimum No. 20 gage (0.0329-inch, 0.84 mm) metal framing members spaced a maximum of 24 inches (610 mm) on center with end joints staggered from adjacent courses in both vertical and horizontal applications. To comply with ANSI A108.11, framing members shall be spaced a maximum of 16 inches (406 mm) on center. To fasten to wood framing members, minimum  $1\frac{1}{4}$ -inch-long (32 mm), corrosion-resistant (galvanized or stainless steel) roofing nails or  $1\frac{1}{4}$ -inch-long (32 mm) No. 8 by 0.375-inch (9.5 mm) HD self-drilling, corrosion-resistant, ribbed waferhead screws are used and spaced a maximum of 8 inches (152 mm) on center at all supports. To fasten to metal framing members, minimum  $1\frac{1}{4}$ -inch-long (32 mm) No. 8 by 0.375-inch (9.5 mm) HD self-drilling, corrosion-resistant ribbed waferhead screws are used and spaced a maximum of 8 inches (152 mm) on center at all supports. Fasteners are located at least  $\frac{3}{8}$  inch (9.5 mm) from board edges and 2 inches (51 mm), minimum, from board corners. Corner gaps are filled with a silicone sealant compatible with fiber-cement underlayments. Underlayments are placed with a minimum  $\frac{1}{4}$ -inch (6.4 mm) clearance from the floor surfaces and other horizontal tile termination locations, such as above tub edges. This gap shall be free of adhesive and grout and filled with a flexible sealant. For large tiled areas, movement joints are provided in accordance with ANSI A108, Section AN-3.7.

Wall tiles complying with ANSI A137.1 are attached to the underlayment with flexible Type I mastic adhesives complying with ANSI A136.1, or acrylic or latex-modified thinset mortars complying with ANSI A118.4, in accordance with ANSI A108. The same adhesives are used to fill and level the sheet joints. Joints shall be reinforced with 2-inch-wide (51 mm), high-strength, coated, alkali-resistant, glass fiber reinforcing tape embedded into the wet mastic or modified thinset mortar and allowed to dry thoroughly.

### 3.3.3 Hardibacker® Underlayment (Ultraboard®)

Hardibacker® underlayment is only intended for interior floors including showers and bath areas (excluding the shower floor). Subsequent finishing with resilient floor covering or tile is required. The underlayment face has a smooth surface, an acrylic based seal coat and square edges for close-butted joints. The reverse side of the underlayment has lightly textured surface, is unsealed and has square edges. Dimensions are noted in Table 1 of this report.

The underlayment shall be installed over a structurally sound subfloor assembly designed to limit the maximum deflection in a plane, including live and dead loads, to  $L/360$  of the span, in accordance with the applicable code.

When the underlayment is installed on existing floor construction, floor finishes and subflooring shall be repaired, removed and/or replaced as necessary to create

a smooth and level surface. The ability of the existing floor structure and subfloor to support the additional loads of the underlayment and new floor finish shall be substantiated. Alterations shall comply with applicable codes.

The underlayment boards are laid in a staggered end joint pattern at right angles to the subflooring. Joints are offset  $\frac{1}{8}$  inch (3.2 mm) from walls and cabinet bases and cut edges turned to the outside, wherever possible.

**3.3.3.1 Resilient Flooring:** With the smooth face up, the underlayment is placed over the prepared subflooring and fastened to support framing with either 3d, corrosion-resistant, ring shank nails or No. 18 gage (0.0475-inch) corrosion-resistant staples with a  $\frac{1}{4}$ -inch (6.4 mm) crown located a maximum of 3 inches (76 mm) on center around the perimeter and 6 inches (152 mm) on center in a random/staggered pattern in the field. Fasteners shall be located at least  $\frac{3}{8}$  inch (9.5 mm) from underlayment edges and 2 inches (51 mm) minimum, from the underlayment corners. Fastener heads shall be flush with the surface. Fasteners shall be of sufficient length to penetrate at least 1-inch (25.4 mm) sound subflooring or framing.

To minimize the possibility of surface irregularities in the underlayment and fastener heads penetrating through the resilient flooring, the boards shall be installed flush and level. Height variations are treated by filling joints, gouges and low spots with a water-resistant, cementitious leveling compound recommended by the floor-covering manufacturer. After the leveling compound has dried, filled areas are sanded level to the surrounding subfloor.

Prior to the application of the resilient flooring, the prepared surfaces shall be free of dust, grease and other foreign material.

Finish floor coverings are installed in accordance with the flooring material manufacturer's published instructions, which shall include application procedures, compatible adhesives and recommended accessories.

**3.3.3.2 Tile:** With the smooth face up, follow the additional instructions described in Section 3.3.2.1 of this report.

**3.3.4 Titan®-FR Panel** Titan®-FR (tapered-edge) panel is only intended for dry interior wall and ceiling applications. The panel has a smooth finish with tapered edges on the two long dimensions for joint treatment. Dimensions are as noted in Table 1 of this report.

Paint or Wallpaper Finish: Titan®-FR tapered-edge panel is installed with the long dimension either vertical or horizontal to nominal 2 x 4 wood framing members or minimum No. 20 gage (0.0329-inch, 0.84 mm) steel framing members, spaced a maximum of 24 inches (610 mm) on center with end joints staggered from adjacent courses in both vertical and horizontal applications. To fasten to wood framing members, minimum  $1\frac{7}{8}$ -inch-long (47.6 mm) gypsum board nails or minimum  $1\frac{1}{2}$  inch-long (38 mm), Type W, gypsum board screws are used and spaced a maximum of 8 inches (203 mm) on center at all supports. To fasten to metal framing members, minimum 1 inch-long (25.4 mm), Type S or S-12, self-drilling gypsum board screws are used and spaced a maximum of 12 inches (305 mm) on center at all supports. Fasteners shall be located at least  $\frac{3}{8}$  inch (9.5 mm) from board edges, and 2 inches (51 mm), minimum, from board corners. wall panels are placed with a minimum  $\frac{1}{4}$ -inch (6.4 mm) clearance from the floor surface. Metal or PVC corner angles are attached with the above described nails or screws placed approximately 12 inches (305 mm) on center.

A flush-joint procedure is permitted on Titan®-FR (tapered-edge) panels. Gypsum board joint compounds,

complying with ASTM C474 and C475, shall be troweled into the joints. Paper joint tape or equivalent is embedded into the wet joint compound and allowed to dry thoroughly. A second coat of joint compound, approximately 8 inches (203 mm) wide, is then applied across the joint and allowed to dry. A third coat of topping compound, 10 inches (254 mm) wide, is applied across the joint. Topping compound shall also be applied over all fastener heads in intermediate locations.

Internal corners are finished by filling with joint compound, working the joint tape into the joint, and applying a second coat of joint compound. A third coat of topping compound is applied over the area.

External corners are treated by filling the joint with joint compound and allowing it to dry thoroughly. Corrosion-resistant metal or PVC corner angles are then fastened to the corner, followed by a second coat of joint compound. When the second coat is completely dry, a third coat of topping compound is applied over the area. Joint compound is also applied over all fastener heads in intermediate locations.

### 3.4 SUBFLOOR PANELS

Compressed sheet is used as subflooring over complying wood or metal floor joists spaced a maximum of 24 inches (610 mm) on center. The panels have a smooth unsanded surface. Cutouts for plumbing and electrical shall be oversized. Floor opening penetrations shall be protected in accordance with the applicable code. Dimensions are noted in Table 1 of this report.

Panels are installed over two or more spans, with the long dimension perpendicular to supports. The sheets are fastened to wood framing members by counterstriking minimum No. 10 x 0.350-inch (8.9 mm) HD wood screws spaced a maximum of 12 inches (305 mm) on center at all supports. The sheets are fastened to metal framing members by counterstriking minimum No. 9 by 0.350-inch (8.9 mm) HD self-drilling, corrosion-resistant ribbed buglehead screws spaced a maximum of 6 inches (152 mm) on center around the sheet perimeter and 12 inches (305 mm) on center at immediate joist locations. Fasteners shall be of sufficient length to penetrate at least 1 inch (25.4 mm) into wood framing members or  $\frac{1}{4}$  inch (6.4 mm) into metal framing members. Holes are drilled in compressed sheet with a masonry bit, allowing a 0.04-inch (1.02 mm) clearance over diameter of screw to be used. Fasteners are located a minimum of  $\frac{3}{8}$  inch (9.5 mm) and a maximum of  $\frac{3}{4}$  inch (19.1 mm) from sheet edges, and 2 inches (51 mm) minimum from sheet corners. Fastener heads are flush with the surface. Edges shall be blocked or the panels shall be covered with minimum  $\frac{1}{4}$ -inch-thick (6.4 mm) underlayment or  $\frac{3}{4}$ -inch-thick (19.1 mm) wood strip finish flooring.

As an alternative, sheets are field glued in conjunction with mechanical fastening with a structural adhesive (APA/HUD AFG-01) applied to joints. Framing members shall be free of surface moisture, dirt, cement and other foreign materials prior to application of the adhesive. Adhesives shall be applied in accordance with the adhesive manufacturer's instructions. The application rate shall be a  $\frac{1}{4}$ -inch (6.4 mm) diameter bead applied to each joist or blocking member, except two  $\frac{1}{4}$ -inch (6.4 mm) diameter beads are applied where sheets abut on a joist. Installation of the sheets shall be within the time limit designated by the adhesive manufacturer.

Where more than one sheet is used, an effective seal shall be provided between sheets. The bonded surfaces shall be clean and an approved structural adhesive (APA/HUD AGF-01) shall be used. Edges of the sheets to be joined shall be thoroughly cleaned and the dust removed. A layer of adhesive is "buttered" to the leading

edge of the first installed sheet and the next sheet laid against it ensuring that an adequate film of adhesive is present. Forcing adhesive into the joint after the sheets have been fastened is not permitted. After the joint is filled, any excess adhesive shall be removed from the surface of the sheet.

Use as a diaphragm is outside the scope of this report.

Allowable loads are as follows:

### ALLOWABLE UNIFORM LOAD AT DEFLECTION LIMIT = $L/360$ <sup>1</sup>

PRODUCT	JOIST SPACING	
	16 inches o.c.	24 inches o.c.
Compressed Sheet II ( $\frac{1}{2}$ - and $\frac{5}{8}$ -inch thick)	190 psf	105 psf
Compressed Sheet II ( $\frac{3}{4}$ -inch thick)	300 psf	145 psf

For SI: 1 inch = 25.4 mm, 1 psf = 47.88 Pa

L = length of span (inches)

### 3.5 FIRE-RESISTANCE RATED ASSEMBLIES

#### 3.5.1 Assembly 1

The nonsymmetrical nonloadbearing, 1 hour, fire-resistance-rated wall assembly consists of minimum  $3\frac{5}{8}$ -inch-deep (92 mm), No. 20 gage (0.0359-inch, 0.91 mm), steel "C" studs at 24 inches (610 mm) on center with corresponding top and bottom tracks. One layer of  $\frac{5}{8}$ -inch-thick (15.9 mm) Type "X" gypsum board, 48 inches (1219 mm) wide, is applied vertically to the studs and secured with  $1\frac{1}{4}$ -inch-long (32 mm), Type S, gypsum board screws, spaced 8 inches (203 mm) on center at board edges and 12 inches (305 mm) on center at intermediate framing members. The  $\frac{5}{8}$ -inch (15.9 mm) thick gypsum board joints and screw heads require treatment consisting of joint compound followed by joint tape and a second layer of joint compound. The opposite face of the wall is covered with one layer of  $\frac{1}{2}$ -inch-thick (12.7 mm) Hardirock<sup>®</sup> Max "C"<sup>™</sup> (Type "X") gypsum board, followed by one layer of either  $\frac{1}{4}$ -inch-thick (6.4 mm) Titan<sup>®</sup> (tapered-edge), Hardibacker<sup>®</sup> (square-edge), or Harditex<sup>®</sup> board. Boards are applied vertically to framing members with vertical edges staggered 24 inches (610 mm). The  $\frac{1}{2}$ -inch-thick (12.7 mm) Hardirock<sup>®</sup> Max "C"<sup>™</sup> (Type "X") gypsum board is fastened to the framing members with  $1\frac{1}{4}$ -inch-long (32 mm), Type S, gypsum board screws spaced 24 inches (610 mm) on center. Titan<sup>®</sup>, Hardibacker<sup>®</sup> or Harditex<sup>®</sup> boards are fastened through the gypsum board to the framing members with minimum  $1\frac{5}{8}$ -inch-long (41 mm) by minimum 0.323-inch (8.2 mm) HD or self-drilling, corrosion-resistant, ribbed buglehead or ribbed waferhead screws located a maximum of 8 inches (203 mm) on center. Board joints and fasteners require treatment similar to that described in Sections 3.3.1.1, 3.3.1.2, 3.3.2.2, and 3.2.4 of this report.

#### 3.5.2 Assembly 2

The nonsymmetrical nonload bearing, 1-hour, fire-resistant-rated wall assembly consists of minimum  $3\frac{5}{8}$ -inch-deep (92 mm), No. 25 gage (0.0209-inch, 0.53 mm), steel "C" studs at 16 inches (406 mm) on center with corresponding top and bottom tracks. One layer of  $\frac{5}{8}$ -inch-thick (15.9 mm) Type "X" gypsum board, 48 inches

(1219 mm) wide, is applied vertically to the studs and secured with minimum 1 inch-long (25.4 mm), Type S, gypsum board screws, spaced 8 inches (203 mm) on center at board edges and 12 inches (305 mm) on center at intermediate framing members. The  $\frac{5}{8}$ -inch-thick (15.9 mm) Type "X" gypsum board joints and screw heads require treatment consisting of joint compound followed by joint tape and a second layer of joint compound. The stud cavities are insulated with minimum 3-inch-thick (76 mm), 3 pcf (48 kg/m<sup>3</sup>), unfaced, friction-fit, mineral fiber insulation complying with ASTM C665, Type I. The opposite face of the wall is covered with one layer of  $\frac{7}{16}$ -inch-thick (11.1 mm) Hardibacker<sup>®</sup> (backerboard) or Titan<sup>®</sup> panel or Harditex<sup>®</sup> boards. The boards are applied vertically to framing members with vertical edges staggered 16 inches (406 mm). Hardibacker<sup>®</sup>, Titan<sup>®</sup> or Harditex<sup>®</sup> boards are fastened through to the framing members with minimum 1-inch-long (25.4 mm) No. 8 by 0.323-inch (8.2 mm) HD self-drilling, corrosion-resistant, ribbed buglehead (or equivalent) screws located a maximum of 6 inches (152 mm) on center. Board joints and fasteners require treatment similar to that described in Sections 3.3.1.1, 3.3.1.2 or 3.3.2.2 of this report, and using the glass fiber reinforcing tape.

### 3.5.3 Assembly 3

The nonsymmetrical limited loadbearing, 1 hour fire-resistant rated wall assembly consists of nominal 2 x 4 wood studs at 16 inches (406 mm) on center with two top plates and a single bottom plate. The lesser of 800 pounds per stud or 31 percent of full design load is permitted to be superimposed, provided structural consideration for axial, flexural and bearing perpendicular-to-grain stresses are resolved in accordance with Part III of the *National Design Specification*, 1997 edition, published by the American Forest & Paper Association. One layer of  $\frac{5}{8}$ -inch-thick (15.9 mm) Type "X" gypsum board, 48 inches (1219 mm) wide, is applied vertically to the studs and secured with minimum  $\frac{1}{8}$ -inch-long (22 mm) cup-head gypsum board nails, spaced 7 inches (178 mm) on center at board edges and intermediate framing members. The  $\frac{5}{8}$ -inch-thick (15.9 mm) Type "X" gypsum board joints and nail heads require treatment consisting of joint compound followed by joint tape and a second layer of joint compound. The stud cavities are insulated with minimum 3-inch-thick (76 mm), 3 pcf, unfaced, friction-fit, mineral fiber insulation complying with ASTM C665, Type I. The opposite face of the wall is covered with one layer of  $\frac{7}{16}$ -inch-thick (11.1 mm) Titan<sup>®</sup> panel or Hardibacker<sup>®</sup> backerboard. The fiber cement board is applied vertically to framing members with vertical edges staggered 16 inches (406 mm) from the gypsum board edges. Boards are fastened through to the framing members with minimum  $\frac{1}{2}$ -inch-long (38 mm), corrosion-resistant roofing nails located a maximum of 6 inches (152 mm) on center. Board joints and fasteners require treatment similar to that described in Section 3.3.2.2 of this report. The side of the wall clad with fiber-cement board is covered with standard grade ceramic tile, nominal  $\frac{1}{4}$ -inch thick. Tiles, any expansion or control joints, and grout are installed in accordance with ANSI A108.4 when Type I organic adhesive is used, or ANSI A108.5 if dry set, acrylic-modified or latex-modified portland cement mortar is used.

### 3.5.4 Assembly 4

The nonsymmetrical loadbearing 1 hour fire-resistant rated wall assembly consists of nominal 2 x 4 wood studs at 24 inches (610 mm) on center with two top plates and a single bottom plate. Full design loads are permitted to be superimposed, provided structural consideration for axial flexural and bearing perpendicular-to-grain stresses are resolved in accordance with Part III of the *National Design Specification*, 1997 Edition, published by the American Forest & Paper Association. One layer of  $\frac{5}{8}$ -inch-thick

(15.9) Type "X" gypsum board, 48 inches (1219 mm) wide, is applied vertically to the studs and secured with minimum  $\frac{3}{4}$ -inch-long (44 mm) cup-head gypsum board nails, spaced 7 inches (178 mm) on center at board edges and intermediate framing members. The  $\frac{5}{8}$ -inch-thick (15.9 mm) Type "X" gypsum board joints and nail heads require treatment consisting of joint compound followed by joint tape and a second layer of joint compound. The stud cavities are either insulated or uninsulated. The opposite face of the wall is covered with one layer of  $\frac{1}{2}$ -inch-thick (12.7 mm) Type "X" water-resistant core gypsum sheathing and one layer of maximum 12-inch-wide (305 mm) Hardiplank<sup>®</sup> lap siding lapped a minimum of  $\frac{1}{4}$  inches (32 mm). The  $\frac{1}{2}$ -inch-thick (12.7 mm) Type "X" water-resistant core gypsum sheathing is applied vertically to framing members with vertical edges staggered 24 inches (610 mm) from the joints on the opposite side. The  $\frac{1}{2}$ -inch-thick (12.7 mm) Type "X" water-resistant core gypsum sheathing is fastened to the framing members with  $\frac{1}{4}$ -inch-long (44 mm) roofing nails spaced 7 inches (178 mm) on center in the field and 4 inches (102 mm) on center along the perimeter of each board. An outer layer of  $\frac{5}{16}$ -inch-thick (7.5 mm), 12-inch-wide (305 mm) Hardiplank<sup>®</sup> lap siding is applied over the  $\frac{1}{2}$ -inch-thick (12.7 mm) Type "X" water-resistant core gypsum sheathing by attaching a  $\frac{1}{2}$ -inch-wide (38 mm) Hardiplank<sup>®</sup> starter strip attached through the gypsum sheathing into the bottom plate and 12-inch-wide (305 mm) Hardiplank<sup>®</sup> lap siding applied horizontally with a minimum nominal  $\frac{1}{4}$ -inch headlap and fastened with a single 6d corrosion resistant common nail driven through the lapped planks at each stud.

### 3.5.5 Assembly 5

The symmetrical nonload bearing, 1-hour, fire-resistant-rated wall assembly consists of minimum 3  $\frac{5}{8}$ -inch-deep (92 mm), No. 20 gage (0.0359 inch, 0.91 mm), steel "C" studs at 24 inches (610 mm) on center with corresponding top and bottom tracks. Both sides of the wall are covered with one layer of  $\frac{1}{2}$ -inch-thick (12.7 mm) Hardirock<sup>®</sup> Max "C"<sup>™</sup> (Type "X") gypsum board, followed by one layer of either  $\frac{1}{4}$ -inch-thick (6.4 mm) Titan<sup>®</sup> panel, Hardibacker<sup>®</sup> backerboard, or Harditex<sup>®</sup> baseboards. Boards are applied either perpendicular (horizontally) or parallel (vertically) to framing members. Base layer and face layer board joints of both wall sides are offset by 24 inches (610 mm). The  $\frac{1}{2}$ -inch-thick (12.7 mm) Hardirock<sup>®</sup> Max "C"<sup>™</sup> (Type "X") gypsum board is fastened to the framing members with minimum 1-inch-long (25.4 mm), Type S, gypsum board screws spaced 24 inches (610 mm) on center. Titan<sup>®</sup>, Hardibacker<sup>®</sup> or Harditex<sup>®</sup> boards are fastened through the gypsum board to the framing members with minimum  $\frac{1}{8}$ -inch-long (41 mm) by minimum 0.323-inch (8.2 mm) HD self-drilling, corrosion-resistant, ribbed buglehead or ribbed waferhead screws located a maximum of 8 inches (203 mm) on center. Board joints and fasteners require finish treatment similar to that described in Sections 3.3.1.1, 3.3.1.2, 3.3.2.2, or 3.2.4 and of this report.

### 3.5.6 Assembly 6

The symmetrical nonload bearing, 1-hour, fire-resistant-rated wall assembly consists of minimum 3  $\frac{5}{8}$ -inch-deep (92 mm), No. 20 gage (0.0359 inch, 0.91 mm), steel "C" studs at 24 inches (610 mm) on center with corresponding top and bottom tracks. Both sides of the wall are covered with one layer of  $\frac{5}{8}$ -inch-thick (15.9 mm) Titan<sup>®</sup>-FR panel. Boards are applied either perpendicular (horizontally) or parallel (vertically) to framing members. Panel joints are offset by 24 inches (610 mm). The  $\frac{5}{8}$ -inch (15.9 mm) thick Titan<sup>®</sup>-FR panel is fastened to the framing members with minimum 1-inch-long (25.4 mm), Type S, gypsum board screws spaced 12 inches (305 mm) on center. Board joints and fasteners require finish treatment similar to that described in Sections 3.3.1.1 or 3.3.1.2 of this report.

#### 4.0 INSTALLATION

Installation shall comply with this report and a copy of this report shall be available at all times on the job site during installation. Additional details are in the applicable manufacturer's product information sheets issued December 1993. Where non-editorial differences occur between the manufacturer's product information sheets and this report, this report shall be null and void.

#### 5.0 IDENTIFICATION

James Hardie Building Products, Inc., Hardiflex<sup>®</sup>, Hardipanel<sup>®</sup>, Cempanel<sup>®</sup>, Hardisoffit<sup>®</sup> and Cemsoffit<sup>®</sup> boards; Harditex<sup>®</sup> baseboards; Titan<sup>®</sup>, Titan<sup>®</sup>-FR, Hardibacker<sup>®</sup>, Ultraboard<sup>®</sup> and Hardibacker 500<sup>®</sup> lining boards, backerboard and underlayment; Compressed Sheet subflooring; pallets of Hardiplank<sup>®</sup> and Cemplank<sup>®</sup> lap siding; and pallets of Hardishingle<sup>™</sup> planks and panels shall bear a label identifying the manufacturer's name and telephone number, the product name, and this ICC-ES Legacy report number (NER-405) for field identification.

#### 6.0 EVIDENCE SUBMITTED

**6.1** The following test reports issued by the Building Research Association of New Zealand (BRANZ) in accordance with ASTM E72, *Conducting Strength Test of Panels of Building Construction*, Section 9, Transverse Load, and Section 14, Racking Load:

Report No.	Date	ASTM Standard Section
S100	June, 1984	9
S101	June, 1984	9
S102	June, 1984	9
S103	June, 1984	9
S104	June, 1984	9
S105	June, 1984	14
S106	June, 1984	14
S109	July, 1984	9
S112	August, 1984	14
S113	August, 1984	9
STR122	April, 1985	9
STR123	April, 1985	14
STR127	April, 1985	9
STR128	May, 1985	14
STR131	May, 1985	9
STR132	May, 1985	14

**6.2** The following test reports issued by the Building Research Association of New Zealand (BRANZ) in accordance with the weatherability test procedures noted:

Report No.	Date	Procedure
MTR658	November, 1983	U.B.C. Standard 32-12
MTR662	November, 1983	Freeze/Thaw
MTR709	June, 1984	Percolation Test
MTR723	May, 1984	ASTM G26, D2616, FD-714
MTR778	June, 1985	NSZ3204; Wet/Dry Cycling
MTR787	June, 1985	U.B.C. Standard 47-17
T176	June, 1984	ASTM E96
T177	June, 1984	ASTM E96

**6.3** Quality Assurance Manual for James Hardie Building Products, Inc., signed by Rich Klein, James Hardie Building Products, Inc. 2/18/02 and Kathy Bishop, Intertek Testing Services, Inc. 2/20/02.

**6.4** Manufacturer's descriptive literature.

**6.5** United States Testing Company, Test Report No. LA 50049-1, dated February 7, 1985, containing testing in accordance with ASTM E84, *Test of Surface Burning Characteristic of Building Materials*.

**6.6** Ramtech Laboratories, Inc., Test Report No. 8047-87, dated April 6, 1987, containing testing in accordance with ASTM E72, *Conducting Strength Tests of Panels for Building Construction* — Section 9, Transverse Load; and Section 14, Racking Load.

**6.7** Structural Calculations for "Determination of Wind Speed" by Ronald I. Ogawa, P.E., in accordance with Section 1205 of the 1988 *Standard Building Code*<sup>®</sup>.

**6.8** The following test reports were issued by Inspection Concepts for "Transverse Load Tests" of panels:

Report No.	Date
IC-1021-88	May, 1988
IC-1022-88	May, 1988
IC-1042-88	February, 1989
IC-1054-89	September, 1989
IC-1055-89	September, 1989
IC-1121A-91	March 20, 1991
IC-1121B-91	March 20, 1991
IC-1201-92	January 22, 1993
IC-1203-92	January 22, 1993
IC-1228-93	July 2, 1993
IC-1270-94	April 20, 1994
IC-1271-94	April 20, 1994

- 6.9** The following test reports were issued by Inspection Concepts for “Racking Tests” of panels:

Report No.	Date
IC-1013-88	January, 1988
IC-1014-88	January, 1988
IC-1030-88	September, 1988
IC-1032-88	September, 1988
IC-1037-88	November, 1988
IC-1038-88	November, 1988
IC-1057-89	September, 1989
IC-1062-89	November, 1989
IC-1100-90	October 30, 1990
IC-1107-91	January 5, 1991
IC-1108-91	January 6, 1991
IC-1109-91	January 8, 1991
IC-1110-91	January 8, 1991
IC-1120A-91	March 20, 1991
IC-1120B-91	March 20, 1991
IC-1120C-91	March 20, 1991
IC-1120D-91	March 20, 1991
IC-1202-92	January 22, 1993
IC-1202-92	January 22, 1993
IC-1237-93	August 5, 1993
IC-1273-94	April 20, 1994
IC-1274-94	April 29, 1994

- 6.10** The following test reports were issued by Inspection Concepts for “Transverse Load Tests” of planks:

Report No.	Date
IC-1020-88	May, 1988
IC-1011-88	January, 1988
IC-1034-88	October, 1988
IC-1035-88	October, 1988

- 6.11** The following test reports were issued by Southwest Research Institute for “1 hour Fire-resistant Assemblies”:

Report No.	Date
01-2602-802	March, 1989
01-2602-803	March, 1989

- 6.12** Structural calculations verifying design values for **Tables 2 and 3** of this report, prepared by Inspection Concepts dated March 7, 1990, signed and sealed by Ronald I. Ogawa, P.E.

- 6.13** Inspection Concepts, Test Report No. IC-1093A-90, dated October 18, 1990, in accordance with ASTM E136.

- 6.14** Smith-Emery Company, Test Report No. L-87-1732, dated October 8, 1987, in accordance with ANSI A118.9.

- 6.15** United States Testing Company, Inc., Test Report No. 176842, dated September 14, 1990, in accordance with ASTM D1037.

- 6.16** Truesdail Laboratories, Inc., Test Report No. 30240-1, dated March 1, 1989, revised March 28, 1991, in accordance with ASTM G21.

- 6.17** Truesdail Laboratories, Inc., Test Report No. 30240-2, dated March 1, 1989, revised March 28, 1991, in accordance with ASTM G22.

- 6.18** Inspection Concepts, Report No. IC-1131-91, dated May 8, 1991, in accordance with ASTM C947, C666 Procedure B, and ANSI 136-1.

- 6.19** ETL Testing Laboratories, Report No. 497742, dated March 5, 1990, in accordance with ASTM E84.

- 6.20** Inspection Concepts, Report No. IC-1039-89, dated January 6, 1989, revised May 11, 1990, containing comparative fastener pullout and pull-through testing results.

- 6.21** James Hardie Building Products, Inc. product information sheets issued October 1991.

- 6.22** Structural calculations verifying design values for Tables 2 and 3 of this report, prepared by Inspection Concepts dated October 20, 1993, signed by Ronald I. Ogawa, P.E.

- 6.23** Letter correcting structural calculations for BRANZ Reports S106 and STR128 prepared by Inspection Concepts dated February 14, 1993, signed and sealed by Ronald I. Ogawa, P.E.

- 6.24** Letter reviewing “Racking Tests” and “Transverse Load Tests” for Group III wood species verification for Tables 2 and 3 of this report, prepared by Inspection Concepts dated October 14, 1993, signed and sealed by Ronald I. Ogawa, P.E.

- 6.25** The following test reports were issued by Omega Point Laboratories for “1 hour Fire-resistant Assemblies”:

Report No.	Date
11710-92783	February 13, 1992
11710-92851	September 9, 1992
11710-98414	May 1, 1995
11710-105198	August 2, 1999
11710-105199	August 3, 1999

- 6.26** Ramtech Laboratories, Inc., Test Report No. 8108A-87, dated May 20, 1987, in accordance with ASTM C725 for flexural strength tests conducted on  $\frac{1}{4}$ -inch- and  $\frac{3}{4}$ -inch-thick compressed sheet panels.

- 6.27** Ramtech Laboratories, Inc., Test Report No. 8108B-87, dated May 26, 1987, in accordance with ASTM E72, Section 18, concentrated load on  $\frac{1}{4}$ -inch and  $\frac{3}{4}$ -inch thick compressed sheet panels.

- 6.28** Ramtech Laboratories, Inc., Test Report No. 8108C-87, dated June 24, 1987, in accordance with ASTM E72, Section 9, transverse load on  $\frac{1}{4}$ -inch and  $\frac{3}{4}$ -inch thick compressed sheet panels.

- 6.29** Inspection Concepts, Test Report No. IC-1257-94, dated January 13, 1994, in accordance with ASTM E331 for water penetration of  $\frac{1}{4}$ -inch-thick Hardipanel® vertical siding.
- 6.30** Inspection Concepts, Test Report No. IC-1243-93, dated August 26, 1993, in accordance with ASTM E228 for linear-thermal expansion of  $\frac{1}{4}$ -inch-thick James Hardie fiber cement products.
- 6.31** Ramtech Laboratories, Inc., Laboratory No. 9778-93, IC-1225-93, dated June 4, 1993,. The Hardibacker board was tested in accordance with ASTM C177 *Test for Steady-State Thermal Transmission Properties by Means of the Guarded Hot Plate*. The results are listed in Table 4 of this report.
- 6.32** Ramtech Laboratories, Inc., Test Report No. IC-1230-93, Laboratory No. 9778-93, dated June 1993. The Hardibacker® board materials were tested in accordance with ASTM E96-90 to determine the water vapor transmission properties. The average permeance (perms) of the panels are shown in Table 5 of this report.
- 6.33** Ramtech Laboratories, Inc. Laboratory No. 10367A-95/1363, dated September 18, 1995. The  $7\frac{1}{4}$ -inch- and  $9\frac{1}{4}$ -inch-wide Hardiplank® lap sidings were tested in accordance with ASTM E330 Transverse Load Test. The panels were installed on nominal 2 x 4 wood structural members spaced 16 inches on center (o.c.).
- 6.34** Structural Calculations verifying design values for Table 3 of this report, prepared by Inspection Concepts dated October 6, 1995, signed by Ronald I. Ogawa, P.E.
- 6.35** Wind analysis and calculations for Hardishingle and Hardislate roofing and Hardie® Shingleside® cladding installed with 8-, 7-, and 6-inch weather exposures. Analysis and calculations conducted by Ronald I. Ogawa, P.E. dated March 28, 1997; March 31, 1997; and April 2, 1997.
- 6.36** Structural calculations to determine design wind load on 8.25 Hardiplank®, dated October 24, 1996, signed and sealed by Ronald I. Ogawa, P.E. of Inspection Concepts Inc..
- 6.37** Structural calculations to determine design values for Tables 2a, 2b, and 3 of this report, prepared by Inspection Concepts dated July 16, 1997, July 19, 1997, and August 19, 1997, signed and sealed by Ronald I. Ogawa, P.E.
- 6.38** Ramtech Laboratories, Inc., Report Lab. No. 10868-97/1475, dated June 26, 1997. The report contains results of testing in accordance with ASTM E72 and ASTM E330 on  $\frac{5}{16}$ -inch-thick Hardipanel.
- 6.39** Ramtech Laboratories, Inc., Report Lab. No. 10869-97/1482, dated July 14, 1997 containing results of transverse load testing in accordance with ASTM E72 on  $9\frac{1}{4}$ -inch-wide Hardiplank® lap siding.
- 6.40** Applied Research Laboratories, Lab No. 29278-UD1, dated September 1, 1994, containing reports of tensile pull-out testing of fasteners.
- 6.41** Structural calculations to determine the allowable fastener spacing based on a wind speed of 110 mph, Exposure Category C, prepared by Inspection Concepts, dated November 2, 1994, signed and sealed by Ronald I. Ogawa, P.E.
- 6.42** Ramtech Laboratories, Inc., Laboratory Number 10794-97/1458, dated March 13, 1997, containing results of an Uplift Resistance Test of 18-inch long by 12-inch-wide by  $\frac{1}{4}$ -inch-thick Hardishingle™ roofing installed on  $\frac{5}{32}$ -inch-thick, 4-ply, 3-layer CDX plywood.
- 6.43** Ramtech Laboratories, Inc., Laboratory Number 10794-97/1460, dated March 13, 1997, containing results of an Uplift Resistance Test of 18-inch-long by 12-inch-wide by  $\frac{1}{4}$ -inch-thick Hardie® Shingleside® as siding roofing installed on  $\frac{7}{16}$ -inch-thick Oriented Strand Board utilizing 2 siding nails per 12-inch wide panel.
- 6.44** Ramtech Laboratories, Inc., Laboratory Number 10794-97/1464, dated March 13, 1997, containing results of an Uplift Resistance Test of 18-inch long by 12-inch-wide by  $\frac{1}{4}$ -inch-thick Hardie® Shingleside® as siding roofing installed on  $\frac{7}{16}$ -inch-thick Oriented Strand Board utilizing 3 siding nails per 12-inch-wide panel.
- 6.45** Ramtech Laboratories, Inc., Laboratory Number 11149-98/1554, dated October 7, 1998, containing results of an ASTM E330 Transverse Load Test of  $6\frac{1}{4}$ -inch-wide Hardiplank® siding installed on 20-ga. metal framing members spaced at 16-inch and 24-inch centers and fastened with ET & F pin fasteners through the lap to each stud.
- 6.46** Ramtech Laboratories, Inc., Laboratory Number 11149-98/1554A, dated October 7, 1998, containing results of an ASTM E330 Transverse Load Test of 12-inch-wide Hardiplank® siding installed on 20-ga. metal framing members spaced at 16-inch and 24-inch centers and fastened with ET & F pin fasteners through the lap to each stud.
- 6.47** Ramtech Laboratories, Inc., Laboratory Number 11149-98/1554B, dated October 7, 1998, containing results of an ASTM E330 Transverse Load Test of  $8\frac{1}{4}$ -inch-wide Hardiplank® siding installed on 20-ga. metal framing members spaced at 16-inch and 24-inch centers and fastened with ET & F pin fasteners blind nailed to each stud.
- 6.48** Ramtech Laboratories, Inc., Laboratory Number 11284-99/1580, dated April 15, 1999, containing results of an ASTM E72 Racking Shear Test of  $\frac{5}{16}$ -inch-thick x 48-inch-wide x 96-inch-long Hardipanel® siding installed on 20-ga. metal framing members spaced at 16-inch and 24-inch centers and fastened with ET & F pin fasteners spaced at 4 inches o.c. perimeter and 8 inches o.c. intermediate framing members.
- 6.49** Ramtech Laboratories, Inc., Laboratory Number 11149-98/1554D, dated September 14, 1998, containing results of an ASTM E330 Transverse Load Test of  $\frac{5}{16}$ -inch-thick x 48-inch-wide x 96- inch-long Hardipanel® siding installed on 20-ga. metal framing members spaced at 16-inch and 24-inch centers and fastened with ET & F pin fasteners spaced at 4 inches o.c. perimeter and 8 inches o.c. intermediate framing members.
- 6.50** Wind analysis and calculations for Hardipanel® panels for exposure categories B, C, and D. Analysis and calculations signed and sealed by Ronald I. Ogawa, P.E., dated March 26, 2000.
- 6.51** Ramtech Laboratories, Inc., Laboratory Number 11552/1636, dated April 20, 2000, containing results

of an ASTM E330 Uplift Resistance Test of  $\frac{1}{4}$ -inch-thick x 24-inch-wide vented Hardisoffit<sup>®</sup> panel installed on nominal 2 x 4 framing members spaced at 24 inch centers and fastened with  $1\frac{1}{4}$ -inch-long x 0.083-inch shank x 0.187-inch HD nails spaced at 8 inches o.c. perimeter and intermediate framing members.

- 6.52** Wind analysis and calculations for 24-inch-wide vented Hardisoffit<sup>®</sup> panel for exposure categories B, C, and D. Analysis and calculations signed and sealed by Ronald I. Ogawa, P.E., dated May 4, 2000.
- 6.53** Ramtech Laboratories, Inc., Laboratory Number 11436-99/1602, dated October 29, 1999, containing results of an ASTM E330 Transverse Load Test of  $\frac{1}{4}$ -inch-thick x 19-inch-long x 48-inch-wide Heritage<sup>™</sup> (half round) panel siding installed on  $\frac{7}{16}$ -inch-thick APA rated Oriented Strand Board sheathing only with  $1\frac{1}{4}$ -inch-long x 0.083-inch shank x 0.187-inch HD nails spaced at  $13\frac{3}{4}$ -inch o.c.
- 6.54** Ramtech Laboratories, Inc., Laboratory Number 11436-99/1603, dated October 27, 1999, containing results of an ASTM E330 Transverse Load Test of  $\frac{1}{4}$ -inch-thick x 19-inch-long x 48-inch-wide Heritage<sup>™</sup> (half round) panel siding installed on nominal 2 x 4 framing members spaced at 16-inch centers and fastened with  $1\frac{1}{4}$ -inch-long x 0.083-inch shank x 0.187-inch HD nails to each framing member.
- 6.55** Ramtech Laboratories, Inc., Laboratory Number 11436-99/1604, dated October 28, 1999, containing results of an ASTM E330 Transverse Load Test of  $\frac{1}{4}$ -inch-thick x 19-inch-long x 48-inch-wide Heritage<sup>™</sup> (half round) panel siding installed on nominal 2 x 4 framing members spaced at 24-inch centers and fastened with  $1\frac{1}{4}$ -inch-long x 0.083-inch shank x 0.187-inch HD nails to each framing member.
- 6.56** Letter justifying horizontal application of panels in accordance with Table 3 of this report, based on Table 23-II-I-1 of the 1997 *Uniform Building Code*<sup>™</sup> and similar tables in the BOCA<sup>®</sup> *National Building Code*/1999 and 1999 *Standard Building Code*<sup>®</sup>, prepared by Inspection Concepts Inc., dated October 20, 1999, and signed and sealed by Ronald I. Ogawa, P.E.
- 6.57** Wind analysis and calculations for Hardiplank<sup>®</sup> lap siding installed with ET & F pin fasteners for exposure categories B, C, and D. Analysis and calculations signed and sealed by Ronald I. Ogawa, P.E., dated December 14, 1998.
- 6.58** Wind analysis and calculations for Hardiplank<sup>®</sup> lap siding based on various test reports of installations with nail and screw fasteners. Analysis and calculations signed and sealed by Ronald I. Ogawa, P.E., dated July 7, 1998.
- 6.59** Underwriters Laboratories Inc. letter, dated May 29, 1997, recognizing James Hardie Gypsum's  $\frac{1}{4}$ -inch-thick Hardirock<sup>®</sup> Max "C"<sup>™</sup> gypsum board as an alternative to Super Fire X gypsum board.
- 6.60** Underwriters Laboratories Inc. letter, dated February 23, 2000, recognizing James Hardie<sup>®</sup> Gypsum's  $\frac{1}{4}$ -inch-thick Hardirock<sup>®</sup> Max "C"<sup>™</sup> gypsum board as an alternative to Super Fire X gypsum board.
- 6.61** Underwriters Laboratories, Inc., File R8701, Project 96NK16606, dated December 19, 1996, containing results of ANSI/UL 263 (ASTM E119, NFPA 251), *Fire Tests of Building Construction and Materials*, for  $\frac{1}{4}$ -inch-thick x 8-foot-long x 4-foot-wide gypsum board installed on steel columns of 25 MSG steel studs spaced at 12-inch centers and fastened with 3-inch-long Type S self-drilling, self-tapping board screws spaced at 12-inch centers in a UL G512 assembly.
- 6.62** Underwriters Laboratories, Inc., File R8701, Project 96NK35820, dated July 23, 1997, containing results of ANSI/UL 263 (ASTM E119, NFPA 251), *Fire Tests of Building Construction and Materials*, for  $\frac{5}{8}$ -inch-thick x 144-inch-long x 48-inch-wide gypsum board installed in a UL X515 floor-ceiling assembly.
- 6.63** Wind analysis and calculations for Shingleside<sup>®</sup> Heritage<sup>™</sup> panels for exposure categories B, C, and D. Analysis and calculations signed and sealed by Ronald I. Ogawa, P.E., dated December 3, 1999.
- 6.64** Ramtech Laboratories, Inc., Laboratory Number 11436-99/1612, dated December 20, 1999, containing results of an ASTM E72 Racking Shear Test of  $\frac{5}{16}$ -inch-thick x 48-inch-wide x 96-inch-long Hardipanel<sup>®</sup> Shiplap siding installed on nominal 2 x 4 wood framing members spaced at 16-inch centers and fastened with 0.092-inch shank by 0.225-inch HD by 2-inch-long nails spaced at 3 inches o.c. perimeter and 8 inches o.c. intermediate framing members.
- 6.65** Ramtech Laboratories, Inc., Laboratory Number 11436-99/1616, dated December 27, 1999, containing results of an ASTM E72 Racking Shear Test of  $\frac{5}{16}$ -inch-thick x 48-inch-wide x 96-inch-long Hardipanel<sup>®</sup> Shiplap siding installed on nominal 2 x 4 wood framing members spaced at 16-inch centers and fastened with 0.092-inch shank by 0.225-inch HD by 2-inch long nails spaced at 8 inches o.c. perimeter and 8 inches o.c. intermediate framing members.
- 6.66** Wind analysis and calculations of Ramtech Laboratories, Inc., Test Reports Laboratory Number 11436-99/1612 and 11436/1616, prepared by Inspection Concepts dated January 14, 2000, signed and sealed by Ronald I. Ogawa, P.E.
- 6.67** Wind analysis and calculations for Hardipanel<sup>®</sup> installed on steel studs spaced 16 and 24 inches o.c. Analysis and calculations signed and sealed by Ronald I. Ogawa, P.E., dated June 15, 1999.
- 6.68** Ramtech Laboratories, Inc., Laboratory Number 11436-99/1619, dated January 19, 2000, containing results of a Uniform Negative Transverse Load Test of  $\frac{5}{16}$ -inch thick x 48-inch wide x 96-inch long Hardipanel<sup>®</sup> Shiplap Panel installed on nominal 2 x 4 wood framing members spaced at 16-inch centers and fastened with 0.092-inch shank by 0.225-inch HD by 2-inch long ring shank nails spaced at 3 inches and 8 inches o.c. perimeter and 8 inches o.c. field.
- 6.69** Wind analysis and calculations of Ramtech Laboratories, Inc., Test Report Laboratory Number 11436-99/1619, prepared by Inspection Concepts dated February 4, 2000, signed and sealed by Ronald I. Ogawa, P.E.
- 6.70** Ramtech Laboratories, Inc., Laboratory Number 11443/1613, dated February 10, 2000, containing results of testing, in accordance with ASTM C36, of  $\frac{5}{8}$ -inch-thick x 48-inch-wide x 120-inch-long Titan<sup>®</sup>-FR panel consisting of  $\frac{1}{4}$ -inch-thick Hardirock<sup>®</sup> Max "C"<sup>™</sup> gypsum board and  $\frac{3}{32}$ -inch-thick Hardie<sup>®</sup> fiber-cement board adhered with PVA adhesive.

- 6.71** Ramtech Laboratories, Inc., Laboratory Number 11443/1613, dated March 25, 2000, revision to report to additionally show compliance with ASTM C1278.
- 6.72** Ramtech Laboratories, Inc., Laboratory Number 11443/1629, dated March 22, 2000, containing testing of Hardibacker 500<sup>®</sup> in accordance with ASTM C1288, *Standard Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets*.
- 6.73** Omega Point Laboratories, Report Number 11710-106315, dated March 7, 2000, containing results of surface burning characteristic testing, indicating compliance with ASTM E84 for the Hardibacker 500<sup>®</sup> backerboard.
- 6.74** Ramtech Laboratories, Inc., Laboratory Number 11569/1647, dated June 2, 2000, containing results of water tightness testing performed in accordance with ASTM C1185 on Hardibacker 500<sup>®</sup>.
- 6.75** Ramtech Laboratories, Inc., Laboratory Number 11569B/1655, dated June 27, 2000, containing results of falling ball impact testing performed in accordance with ASTM D1037 on Hardibacker 500<sup>®</sup>.
- 6.76** Ramtech Laboratories, Inc. Laboratory Number 11569A/1654, dated July 10, 2000, containing results of flexural strength testing performed in accordance with ASTM C947, freeze thaw testing performed in accordance with ASTM C666, and bacteria resistance testing performed in accordance with ASTM G22 on the Hardibacker 500<sup>®</sup>.
- 6.77** Analysis of screw attachment to 20-gage metal studs and calculations by Ronald I. Ogawa, P.E., signed and sealed 10/10/01.
- 6.78** Analysis and wind load and wind speed by analysis of Ramtech Laboratories Report Lab No. IC-1035-88, analysis prepared by Inspection concepts, Inc., 15-Oct-01, signed and sealed by Ronald I. Ogawa, P.E, 10/16/01.
- 6.79** Test report on thermal conductivity under ASTM C177 for 13/32-inch-thick Hardibacker 500, Ramtech Laboratories, Inc., Lab No. 11670/1685, November 29, 2000, signed and sealed by Ronald I. Ogawa, P.E. and signed by David R. Macey.
- 6.80** Test report on moisture vapor transmission under ASTM E96 for 13/32-inch Hardibacker 500, Ramtech Laboratories, Inc., Lab No. 11639/1674, October 10, 2000, signed and sealed by Ronald I. Ogawa, P.E. and signed by David R. Macey.
- 6.81** Test report equivalency testing for 5/16-inch Hardipanel Cladding with 6-,4-,3- and 2-inch nail spacing on 16- and 24-inch o.c. wood 2x4 studs, Ramtech Laboratories, Inc., Lab No. 11992/1783, January 17, 2002, signed and sealed by Ronald I. Ogawa, P.E. 12/1/02, and David R. Macey, 12/1/02.

## 7.0 CONDITIONS OF USE

The ICC-ES Subcommittee for the National Evaluation Service finds that James Hardie Building Products, as described in this report, comply with or are suitable alternates to that specified in the 2000 *International Building Code*<sup>®</sup>, the BOCA<sup>®</sup> *National Building Code/1999*, the 1999 *Standard Building Code*<sup>®</sup>, the 1997 *Uniform Building Code*<sup>™</sup>, the 2000 *International Residential Code*<sup>®</sup>, the 2002 *Accumulative Supplement to the International*

*Codes*<sup>™</sup>, and the 1998 *International One and Two Family Dwelling Code*<sup>®</sup> subject to the following conditions:

- 7.1** James Hardie Building Products listed in this report shall be installed in accordance with this report. This Evaluation Report and the manufacturer's published installation instructions, when required by the code official, shall be submitted at the time of permit application.
- 7.2** Hardiplank<sup>®</sup> lap siding and Hardishingle<sup>™</sup> cladding shingle and panel sidings shall be installed on exterior walls braced in accordance with the applicable code:
- 7.2.1** Section 2305.7 of the BOCA<sup>®</sup> *National Building Code*.
- 7.2.2** Section 2308.2 of the *Standard Building Code*<sup>®</sup>.
- 7.2.3** Section 2320.11.3 and 2320.11.4 of the *Uniform Building Code*<sup>™</sup>.
- 7.2.4** Section 2308.9.3 of the *International Building Code*<sup>®</sup>.
- 7.2.5** Section R602.10.3 of the *International Residential Code*<sup>®</sup>.
- 7.2.6** Section 602.10 of the *International One and Two Family Dwelling Code*<sup>®</sup>.
- 7.3** Design Wind Loads applied to James Hardie Sidings listed in this report shall be determined in accordance with Chapter 16 of the applicable code and shall be less than those shown in the design tables in this report.
- 7.3.1** Design Tables 2a and 2b as shown in this report provides allowable capacity in MPH for transverse load conditions for James Hardie Sidings attached to studs. When using the *International Building Code*<sup>®</sup> the wind speeds must be converted to 3-second gust wind speed (mph) using Table 1609.3.1 of the IBC and the allowable wind speeds shown in Tables 2a and 2b for the column titled BOCA<sup>®</sup> *National Building Code* (See 7.3.5 below).
- 7.3.2** Design Table 3 as shown in this report provides allowable shear capacity in plf for James Hardie Sidings.
- 7.3.3** Design Tables 6A, 6B, 6C, 7A, 7B, 7C, 8A, 8B, 8C as shown in this report provides allowable capacity in MPH for transverse load conditions for James Hardie Sidings attached to sheathing. When using the *International Building Code*<sup>®</sup> the wind speeds must be converted to 3 second gust wind speed (mph) using Table 1609.3.1 of the IBC and the allowable wind speeds shown in Tables 6A, 7A, and 8A for the BOCA<sup>®</sup> *National Building Code* (See 7.3.5 below).
- 7.3.4** Design Tables 9A, 9B, 9C as shown in this report provides allowable fastener spacing for James Hardiplank Lap Siding attached to CMUs in 110 MPH wind speed. When using the *International Building Code*<sup>®</sup> fastener spacings shown in Table 9B are applicable for a Wind Speed of 130 MPH.

7.3.5

**INTERNATIONAL BUILDING CODE®**  
**TABLE 1609.3.1**  
**EQUIVALENT BASIC WIND SPEEDS<sup>a,b,c</sup>**

V <sub>3s</sub>	85	90	100	105	110	120	125	130	140	145	150	160	170
V <sub>fm</sub>	70	75	80	85	90	100	105	110	120	125	130	140	150

For **SI**: 1 mile per hour = 0.44 m/s.

- a. Linear interpolation is permitted.
- b. V<sub>3s</sub> is the 3 second gust wind speed (mph).
- c. V<sub>fm</sub> is the fastest mile wind speed (mph).

**INTERNATIONAL RESIDENTIAL CODE®**  
**TABLE R301.2.1.3**  
**EQUIVALENT BASIC WIND SPEEDS<sup>a</sup>**

3-second gust	85	90	100	105	110	120	125	130	140	145	150	160	170
Fastest mile	70	75	80	85	90	100	105	110	120	125	130	140	150

For **SI**: 1 mile per hour = 1.609 km/h.

- a. Linear interpolation is permitted.

**7.4** The exterior plank and panel products installed on exterior walls shall be installed over a weather-resistant barrier in accordance with applicable codes.

**7.4.1** In jurisdictions adopting the *Uniform Building Code™* and the *Standard Building Code®*, Harditex® baseboard is acceptable for use as water repellent panel sheathing. The weather-resistance performance of joints and terminations has not been evaluated.

**7.5** Compressed sheet of equivalent thickness to Species Group 1 plywood is an acceptable alternative to plywood subflooring specified in:

**7.5.1** Section 2307.3.3 of the *BOCA® National Building Code*, Table 2307.3.3.

**7.5.2** Section 2307.6 of the *Standard Building Code®*, Table 2307.6C.

**7.5.3** Section 2320.9.2 and Table 23-II-F-1 of the *Uniform Building Code™*.

**7.5.4** Section 2304.7.2 of the *International Building Code®*, Table 2304.7(4).

**7.5.5** Section R503.2.1.1 of the *International Residential Code®*, Table R503.2.1(2).

**7.5.6** Section 503.2.1.1 of the *International One and Two Family Dwelling Code®*, Table 503.2.1.1(2).

**7.6** Use of compressed sheet subfloor as a component of a floor diaphragm is outside the scope of this report.

**7.7** 5/8-inch-thick (15.9 mm) Titan®-FR panel is recognized as an alternative to 5/8-inch-thick (15.9 mm) ASTM C36, Type "X", gypsum board, or

5/8-inch-thick ASTM C1278, Type "X" gypsum fiber panel for use in fire-resistive construction recognized in the above referenced codes.

**7.8** 5/16-inch-thick (7.5 mm) Hardipanel® cladding and Harditex® baseboard are recognized as an alternative to 3/8-inch-thick (9.5 mm) Structural I panel in:

**7.8.1** Table 2306.4.6.2 of the *BOCA® National Building Code*.

**7.8.2** Table 2310.2.B of the *Standard Building Code®*.

**7.8.3** Table 23-II-I-1 of the *Uniform Building Code™*.

**7.8.4** Table 2306.4.1 of the *International Building Code®*.

**7.8.5** Table R703.4 of the *International Residential Code®*.

**7.8.6** Table 703.4 of the *International One and Two Family Dwelling Code®*.

**7.9** Flashing shall be installed at all penetrations and terminations in accordance with the applicable code.

**7.10** The products shall be manufactured at the following locations with quality control inspections by ICC-ES:

- Fontana, California
- Cleburne, Texas
- Plant City, Florida
- Tacoma, Washington
- Waxahachie, Texas
- Peru, Illinois

**7.11** This report is subject to periodic re-examination. For information on the current status of this report, consult the ICC-ES website.

**Table 1  
STANDARD NOMINAL PLANK & PANEL DIMENSIONS**

<b>Product Type</b>	<b>Width</b>	<b>Length</b>	<b>Thicknesses (Inches)</b>
Hardiplank	4, 5-1/4, 6, 6-1/4, 7-1/4, 7-1/2, 8, 8-1/4, 9-1/4, 9-1/2 11-1/4 & 12 inches	12, 14 feet	5/16
Hardisoffit (unvented)	4, 6, 12, 16, 24 & 48 inches	8 & 12 feet	3/16 & 1/4
Hardisoffit (vented)	4, 6, 12, 16 & 24 inches	12 feet	1/4
Hardiflex	48 inches	8, 9 & 10 feet	3/16, 1/4, 5/16 & 3/8
Hardipanel	48 inches	8, 9 & 10 feet	1/4 & 5/16
Harditex	48 inches	8, 9 & 10 feet	1/4, 5/16, 3/8 & 7/16
Hardipanel Shiplap	48-3/4 inches	8, 9 & 10 feet	5/16
Hardibacker (backerboard)	36 & 48 inches	4, 5, 8 feet	1/4 & 7/16
Hardibacker 500 (backerboard)	36 & 48 inches	5, 8, 9, 10 feet	13/32
Titan (tapered edge)	48 inches	8, 9 & 10 feet	1/4 & 7/16
Hardibacker (underlayment)	36 & 48 inches	4, 5 & 8 feet	1/4
Titan-FR	48 inches	8, 9 & 10 feet	5/8
Hardishingle cladding shingles	6, 8, & 12 inches	18 inches	1/4
Hardishingle panel (square & staggered edge)	48 inches	16 inches	1/4
Hardishingle panel (half round)	48 inches	19 inches	1/4
Compressed Sheet	48 inches	8, 9, 10 feet	1/2, 5/8 & 3/4

**Notes to Table 1:**

1. Plank and panel products are also available in other lengths, widths, and thicknesses by special arrangement.
2. 1 inch = 25.4 mm, 1 ft = 304.8 mm

Table 2a — MAXIMUM WIND SPEED

Product Type	Product Thick. (in.)	Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
							Uniform Building Code			Standard Building Code			BOCA National Building Code		
							B	C	D	< 60 ft	C	D	B	C	D
Hardiflex Hardisoffit (unvented)	3/16	4d common 1-1/2 in. long	6	2 x 4 wood	16	20	90	70	-	90	70	-	90	70	-
						40	80		80			80			
						60	70		70			70			
						100	70					70			
Hardipanel Hardiflex Harditex Hardisoffit (unvented)	1/4	4d common 1-1/2 in. long	8	2 x 4 wood	16	20	90		-	90		-	90		-
					24	40	80		80			80			
						60	70		70			70			
						20	70					70			
Hardisoffit (vented)	1/4	0.083" shank x 0.187" HD ringshank nail at 8" o.c. at all bearing	-	2 x 4 SG = 0.40	22.5 max	0-15	150	140	120	150			150	140	110
						20	150	130	120	140			150	130	110
						40	150	130	110	130			150	120	100
						60	150	120	110	120			150	110	100
						100	140	105	100		105	90	130	105	90
Hardipanel Hardiflex Harditex	1/4	6d common 2 in. long	6	2 x 4 wood	16	20	120	100	-	120	120	-	120	100	-
						40	120	95		120	110		120	90	
						60	110	90		120	110		120	90	
						100	100	85		70	70		95	70	
						200	90	80		70			80	70	
Hardipanel Hardiflex Harditex	1/4	No. 11 ga. 1-1/4 in. long galvanized roofing nail	6	2 x 4 wood	16	20	110	80	-	110	80	-	110	80	-
					24	40	105	80		105	80		105	80	
						100	90	70		70		90	70		
						150	80	70		70		80	70		
						200	80					80			
Hardipanel Hardiflex Harditex	1/4	No. 11 ga. 1-1/4 in. long galvanized roofing nail	4 edge 12 field	2 x 4 wood	16	20	120	90	-	120	90	-	120	90	-
						40	120	90		120	90		120	90	
						60			110			100	80		
						100	100	80		80		100	80		
						200	90	70		70		90	70		
Hardipanel Hardiflex Harditex	5/16	0.091 in. shank, 0.225 in. HD, 1.5 in. long ring shank nail	4 edge 8 field	2 x 4 wood <sup>2</sup>	16	0-15	110	100	-	100	80	-	115	85	-
						20	110	95		95	75		110	80	
						40	95	85		85	70		95	75	
						60	90	80		80		85	70		
						100	80					70	70		
Hardipanel Hardiflex Harditex	5/16	4d common 1-1/2 in. long	8	2 x 4 wood	16	40	110	80	-	110	80	-	110	80	-
						100	90	70		70		90	70		
						150	80					80			
						200	70					70			
						20	90					90			
Hardipanel Hardiflex Harditex	5/16	6d common 2 in. long	6	2 x 4 wood	16	20	120	110	-	120	120	-	120	100	-
						40	120	100		120	120		120	90	
						60	110	95		120	100		120	80	
						100	100	90		90		95	70		
						200	90	80				80			
Hardipanel Hardiflex Harditex	5/16	6d common 2 in. long	6	2 x 4 wood	24	20	110	80	-	120	110	-	120	80	-
						40	100	80		105	90		105	80	
						60	90	70		95	90		95	70	
						100	80	70				80			
						200	70					70			
Hardipanel Hardiflex Harditex	5/16	6d common 2 in. long	4	2 x 4 wood	16	20	120	120	-	120	120	-	120	100	-
						40	120	120		120	120		120	100	
						60	120	120		120	110		120	90	
						100	120	110		80		120	80		
						200	120	100		70		105	70		

Table 2a — MAXIMUM WIND SPEED

Product Type	Product Thick. (in.)	Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
							Uniform Building Code			Standard Building Code			BOCA National Building Code		
							B	C	D	< 60 ft	C	D	B	C	D
Hardipanel Hardiflex Harditex	5/16	6d common 2 in. long	4	2 x 4 wood	24	20	120	105	-	120	120	-	120	105	-
						40	120	100	120	110	120	95	120	95	
						60	110	90	120	110	120	90	120	90	
						100	100	85	80	80	100	80	100	80	
						200	90	80	70	70	80	70	80	70	
Hardipanel Hardiflex Harditex	5/16	6d common 2 in. long	6 edge 12 field	2 x 4 wood	16	40	120	90	-	120	90	-	120	90	-
						60	100	80	110	80	100	80	100	80	
						100	90	70	80	70	90	70	90	70	
						200	90	70	70	70	90	70	90	70	
Hardipanel Shiplap Panel	5/16	0.092" shank x 2" x 0.225" HD ringshank nail	3 edge 8 field	2 x 4  SG = 0.40	16	0-15	140	110	95	125			150	110	90
						20	130	105	95	120			150	105	85
						40	120	95	90	110			130	95	80
						60	115	90	85	100			120	90	75
						100	105	85	80	80	80	-	95	80	-
Hardipanel Shiplap Panel	5/16	0.092" shank x 2" x 0.225" HD ringshank nail	4 edge 8 field	2 x 4  SG = 0.40	16	0-15	130	100	90	120			150	105	85
						20	130	100	90	115			140	100	80
						40	115	95	85	100			125	90	75
						60	110	90	80	95	75	-	115	85	75
						100	100	80	75	90	75	-	90	75	-
Hardipanel Shiplap Panel	5/16	0.092" shank x 2" x 0.225" HD ringshank nail	5 edge 8 field	2 x 4  SG = 0.40	16	0-15	130	95	85	115			140	90	80
						20	120	95	80	110			140	90	80
						40	110	85	80	95			120	85	75
						60	100	80	75	90			110	80	-
						100	90	80	70	90	-	-	90	75	-
Hardipanel Shiplap Panel	5/16	0.092" shank x 2" x 0.225" HD ringshank nail	6 edge 8 field	2 x 4  SG = 0.40	16	0-15	120	90	80	105			140	95	75
						20	115	90	80	100			130	90	70
						40	110	85	75	90			110	80	70
						60	100	80	75	85			100	75	-
						100	95	75	-	85	-	-	80	-	-
Hardipanel Shiplap Panel	5/16	0.092" shank x 2" x 0.225" HD ringshank nail	7 edge 8 field	2 x 4  SG = 0.40	16	0-15	110	85	75	100			130	90	70
						20	110	80	70	95			120	85	70
						40	100	80	70	85			100	80	-
						60	90	75	-	80			90	70	-
						100	85	70	-	80	-	-	75	-	-
Hardipanel Shiplap Panel	5/16	0.092" shank x 2" x 0.225" HD ringshank nail	8 edge 8 field	2 x 4  SG = 0.40	16	0-15	105	80	70	90			120	80	70
						20	100	80	70	90			110	80	-
						40	90	70	-	80			95	70	-
						60	85	70	-	75			90	-	-
						100	80	-	-	75			75	-	-
Hardiflex Harditex	7/16	No. 11 ga 1-3/4 in. long galvanized roofing nail	6	2 x 4 wood	16	20	120	120	-	120	120	-	120	120	-
						40	120	110	120	110	120	110	120	110	
						60	120	110	120	100	120	100	120	100	
						100	110	110	120	90	110	90	110	90	
						200	110	100	120	80	100	80	100	80	
Hardishingle Panel Straight Installation	1/4	0.083" shank x0.187" HD ringshank nail into OSB only	13.75		-	0-15	100	70	-	80			110	70	-
						20	90	70	-	80			105	70	-
						40	85	70	-	70			90	70	-
						60	80	-	-	70			80	-	-
						100	70	-	-	70	-	-	70	-	-
Hardishingle Panel Staggered Installation	1/4	0.083" shank x0.187" HD ringshank nail into OSB only	13.75		-	0-15	90	70	-	80			90	70	-
						20	90	70	-	80			90	-	-
						40	80	-	-	70			80	-	-
						60	70	-	-	-			70	-	-
						100	-	-	-	-	-	-	-	-	-
Hardishingle Panel	1/4	0.083" shank x 0.187" HD ringshank nail at each stud	-	2 x 4  SG = 0.40	16	0-15	150	120	110	150			150	120	100
						20	150	120	100	150			150	120	100
						40	140	110	100	130			150	110	90
						60	130	105	95	120			140	100	90
						100	120	100	90	120	90	80	110	90	80

**Table 2a — MAXIMUM WIND SPEED**

Product Type	Product Thick. (in.)	Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
							Uniform Building Code			Standard Building Code			BOCA National Building Code		
							B	C	D	< 60 ft	C	D	B	C	D
Hardishingle Panel	1/4	0.083" shank x 0.187" HD ringshank nail at each stud	-	2 x 4 SG = 0.40	24	0-15	115	90	80	100			130	90	70
						20	110	85	70	100			120	85	70
						40	105	80	70	90			110	80	-
						60	90	75	-	85			100	75	-
						100	85	70	-	-			80	-	-
Hardiflex Hardisoffit (unvented)	3/16	Min. No. 8 x 1 in. long x 0.323 in. HD ribbed buglehead screws	6	Min. No. 20 ga. x 3-5/8 in. x 1-3/8 in. metal C-stud	16	20	80	70	-	80	70	-	80	70	-
						40	80			80			80		
						60	70			70			70		
						100	70			70			70		
Hardipanel Hardiflex Harditex	1/4	Min. No. 8 x 1 in. long x 0.323 in. HD ribbed buglehead screws	6	Min. No. 20 ga. x 3-5/8 in. x 1-3/8 in. metal C-stud	16	20	120	90	N/A	120	90	N/A	120	90	N/A
						40	110	90		110	90		110	90	
						60	100	80		100	80		100	80	
						100	90	80		80	80		90	80	
						150	90	70		70	70		90	70	
					200	80	70		90	70		80	70		
					24	20	90	70	80	70		90	70		
					40	80			70			80			
					60	70			70			70			
					100	70			70			70			
Hardipanel	5/16	ET & F 0.100 x 1.5" x 25" HD ES 4144	4 edge 8 field	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	115	100	130			150	120	100
						20	140	110	100	130			150	110	90
						40	130	105	90	120			140	100	90
						60	120	100	90	110			130	100	80
						100	110	95	85		75	-	105	85	70
Hardipanel	5/16	ET & F 0.100 x 1.5" x 25" HD ES 4144	4 edge 8 field	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	120	90	80	105			135	90	75
						20	110	85	75	100			130	90	70
						40	100	80	70	90			110	80	70
						60	95	75	70	85			100	75	70
						100	85	70	-				80	-	-
Hardiflex Harditex	7/16	Min. No. 8 x 1 in. long x 0.311 in. HD ribbed buglehead screws	6	Min. No. 20 ga. x 3-5/8 in. x 1-3/8 in. metal C-stud	16	20	120	120	-	120	120	-	120	120	-
						40	120	120		120	120		120	120	
						60	120	110		120	120		120	110	
						100	120	110		90	120		120	90	
						200	110	110		80	100		100	80	

**Notes to Table 2a:**

1. Values are for species of wood having a specific gravity of 0.42 or greater, unless otherwise noted.
2. Values are for species of wood having a specific gravity of 0.36 or greater.

Table 2b — MAXIMUM WIND SPEED

Product Type	Product (in.)		Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
	Thick.	Width						Uniform Building Code			Standard Building Code			BOCA National Building Code		
								B	C	D	< 60 ft	C	D	B	C	D
Hardiplank	5/16	4.00	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	150	150	150			150	150	150
							20	150	150	150	150			150	150	150
							40	150	150	150	150			150	150	150
							60	150	150	150	150			150	150	140
							100	150	150	150	140	120	150	140	120	
Hardiplank	5/16	6.00	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	150	140	150			150	150	130
							20	150	150	140	150			150	150	130
							40	150	140	130	150			150	140	120
							60	150	130	120	150			150	130	110
							100	150	130	120	110	100	140	110	100	
Hardiplank	5/16	6.25	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	150	140	150			150	150	130
							20	150	150	130	150			150	150	120
							40	150	140	130	150			150	140	120
							60	140	130	120	150			150	130	110
							100	130	130	120	110	100	130	110	100	
Hardiplank	5/16	7.50	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	140	120	150			150	140	110
							20	150	130	120	150			150	130	110
							40	150	120	110	130			150	120	105
							60	140	120	110	130			150	110	110
							100	130	110	100	80	100	120	100	80	
Hardiplank	5/16	8.00	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	130	110	150			150	130	110
							20	150	130	110	150			150	130	110
							40	150	120	110	130			150	120	100
							60	130	110	105	12			150	110	90
							95	130	110	100	90	120	95	85		
Hardiplank	5/16	8.25	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	130	110	150			150	130	110
							20	150	130	110	140			150	130	100
							40	140	110	100	130			150	115	100
							60	130	110	100	120			140	110	90
							90	120	105	100	80	120	90	80		
Hardiplank	5/16	9.50	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	120	105	140			150	120	100
							20	150	120	100	130			150	120	100
							40	140	110	100	120			140	110	90
							60	120	105	90	110			130	100	90
							80	120	100	90	75	110	80	75		
Hardiplank	5/16	12.00	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	140	110	90	120			150	110	90
							20	140	105	90	120			150	110	90
							40	120	100	90	110			130	100	80
							60	110	95	85	100			120	90	80
							75	105	90	80	70	100	75	70		
Hardiplank	5/16	4.00	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	150	140	130	150			150	150	120
							20	150	140	125	150			150	140	120
							40	150	130	120	150			150	135	110
							60	150	125	115	140			150	125	105
							100	140	120	100	90	130	100	90		
Hardiplank	5/16	6.00	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	150	120	100	140			150	120	100
							20	150	115	100	135			150	120	100
							40	130	110	95	120			140	105	90
							60	125	100	90	110			130	100	85
							80	115	100	90	70	110	80	75		
Hardiplank	5/16	6.25	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	150	120	100	135			150	120	100
							20	150	110	100	130			150	110	95
							40	130	105	95	120			130	105	90
							60	120	100	90	110			120	100	80
							80	110	95	90	70	90	90	70		
Hardiplank	5/16	7.50	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	130	100	90	120			150	100	85
							20	125	100	85	110			140	100	80
							40	115	90	80	100			120	90	75
							60	110	85	80	95			110	80	75
							100	100	80	75	75	90	70	-		

Table 2b — MAXIMUM WIND SPEED

Product Type	Product (in.)		Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
	Thick.	Width						Uniform Building Code			Standard Building Code			BOCA National Building Code		
								B	C	D	< 60 ft	C	D	B	C	D
Hardiplank	5/16	8.00	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	130	100	85	115			150	100	80
							20	120	95	80	110			140	100	80
							40	110	90	80	100			120	90	75
							60	105	85	75	95			110	80	70
						100	95	80	70		70	-	90	70	-	
Hardiplank	5/16	8.25	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	125	95	85	110			140	100	80
							20	120	90	80	105			140	90	80
							40	110	85	80	95			120	85	70
							60	100	80	75	90			110	80	70
						100	90	80	70		70	-	90	70	-	
Hardiplank	5/16	9.50	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	120	90	80	100			130	90	70
							20	110	90	75	100			130	90	70
							40	100	80	70	90			110	80	70
							60	90	80	70	85			110	80	-
						100	85	70	-		-	-	80	-	-	
Hardiplank	5/16	12.00	ET & F pin 0.100 x 1.5" x 0.25" HD	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	100	80	-	90			120	80	-
							20	100	80	-	90			110	80	-
							40	90	70	-	80			90	70	-
							60	85	70	-	75			90	-	-
						100	80	-	-		-	-	70	-	-	
Hardiplank	5/16	4.00	ET & F Panelfast 0.100 x 1.5" x 0.313" HD	Through top edge of plank	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	150	150	150			150	150	150
							20	150	150	150	150			150	150	150
							40	150	150	150	150			150	150	150
							60	150	150	150	150			150	150	150
						100	150	150	150		150	150	150	150	140	
Hardiplank	5/16	6.00	ET & F Panelfast 0.100 x 1.5" x 0.313" HD	Through top edge of plank	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	110	100	130			140	110	90
							20	150	110	100	140			140	105	85
							40	130	100	90	120			130	95	80
							60	120	100	90	110			120	90	80
						100	110	90	80		75	-	95	75	-	
Hardiplank	5/16	6.25	ET & F Panelfast 0.100 x 1.5" x 0.313" HD	Through top edge of plank	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	140	110	100	130			150	100	85
							20	140	110	90	120			140	100	80
							40	120	100	90	115			120	90	75
							60	120	95	85	105			110	85	70
						100	110	90	80		70	-	90	70	-	
Hardiplank	5/16	7.50	ET & F Panelfast 0.100 x 1.5" x 0.313" HD	Through top edge of plank	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	120	90	80	110			130	90	70
							20	120	90	80	100			120	85	70
							40	110	80	75	95			105	75	-
							60	100	80	70	90			95	70	-
						100	90	75	70		-	-	75	-	-	
Hardiplank	5/16	8.00	ET & F Panelfast 0.100 x 1.5" x 0.313" HD	Through top edge of plank	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	110	90	80	100			120	80	70
							20	110	85	70	100			110	80	-
							40	100	80	70	90			100	70	-
							60	90	70	70	80			90	70	-
						100	80	70	-		-	-	70	-	-	
Hardiplank	5/16	8.25	ET & F Panelfast 0.100 x 1.5" x 0.313" HD	Through top edge of plank	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	110	90	70	100			120	80	-
							20	110	80	70	95			110	80	-
							40	100	80	70	85			100	70	-
							60	90	70	-	70			90	-	-
						100	80	70	-		-	-	70	-	-	
Hardiplank	5/16	4.00	ET & F Panelfast 0.100 x 1.5" x 0.313" HD	Through top edge of plank	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	150	150	150	150			150	150	150
							20	150	150	150	150			150	150	140
							40	150	150	150	150			150	150	130
							60	150	150	150	150			150	150	110
						100	150	50	150		130	110	150	130	110	
Hardiplank	5/16	6.00	ET & F Panelfast 0.100 x 1.5" x 0.313" HD	Through top edge of plank	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	130	100	90	110			140	95	80
							20	120	100	85	110			130	90	70
							40	110	90	85	100			110	80	70
							60	110	85	80	90			105	80	-
						100	100	80	70		-	-	80	-	-	

Table 2b — MAXIMUM WIND SPEED

Product Type	Product (in.)		Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
	Thick.	Width						Uniform Building Code			Standard Building Code			BOCA National Building Code		
								B	C	D	< 60 ft	C	D	B	C	D
Hardiplank	5/16	6.25	ET & F Panelfast 0.100 x 1.5" x 0.313" HD	Through top edge of plank	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	120	95	80	110			130	90	70
							20	120	90	80	100			120	85	70
							40	110	85	70	90			110	80	-
							60	100	80	70	80			90	75	-
						100	90	70	70			-	-	70	-	-
Hardiplank	5/16	7.50	ET & F Panelfast 0.100 x 1.5" x 0.313" HD	Through top edge of plank	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	110	90	70	100			120	80	70
							20	110	85	70	100			110	80	-
							40	100	80	70	90			100	70	-
							60	90	75	70	80			90	70	-
						100	85	70	-			-	-	70	-	-
Hardiplank	5/16	8.00	ET & F Panelfast 0.100 x 1.5" x 0.313" HD	Through top edge of plank	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	100	80	70	90			110	70	-
							20	100	75	70	90			100	70	-
							40	90	70	-	80			85	-	-
							60	80	-	-	75			80	-	-
						100	75	-	-			-	-	-	-	-
Hardiplank	5/16	8.25	ET & F Panelfast 0.100 x 1.5" x 0.313" HD	Through top edge of plank	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	90	70	-	80			100	-	-
							20	90	70	-	80			90	-	-
							40	80	-	-	70			80	-	-
							60	75	-	-	70			70	-	-
						100	70	-	-			-	-	-	-	-
Hardiplank	5/16	4.00	6d common 2" long	Through Overlap	2 x 4	16	0-15	150	150	150	150			150	150	150
							20	150	150	150	150			150	150	150
							40	150	150	150	150			150	150	150
							60	150	150	150	150			150	150	130
						100	150	150	140			130	120	150	130	120
Hardiplank	5/16	6.00	6d common 2" long	Through Overlap	2 x 4	16	0-15	150	150	135	150			150	150	130
							20	150	150	130	150			150	150	130
							40	150	150	120	150			150	140	120
							60	150	150	120	150			150	130	115
						100	150	150	120			110	100	140	110	100
Hardiplank	5/16	6.25	6d common 2" long	Through Overlap	2 x 4	16	0-15	150	150	120	150			150	150	130
							20	150	150	120	150			150	150	120
							40	150	150	120	150			150	40	120
							60	150	130	120	150			150	130	115
						100	150	130	110			110	100	150	110	100
Hardiplank	5/16	7.50	6d common 2" long	Through Overlap	2 x 4	16	0-15	150	150	120	150			150	140	120
							20	50	150	120	150			150	140	120
							40	150	130	110	140			150	120	120
							60	150	120	110	130			150	120	115
						100	130	110	110			110	90	140	100	90
Hardiplank	5/16	8.00	6d common 2" long	Through Overlap	2 x 4	16	0-15	150	130	120	150			150	140	110
							20	150	130	115	150			150	140	110
							40	150	120	110	130			150	120	100
							60	140	120	105	130			150	115	100
						100	130	110	100			95	85	120	95	85
Hardiplank	5/16	8.25	6d common 2" long	Through Overlap	2 x 4	16	0-15	150	130	115	150			150	140	110
							20	150	130	110	150			150	130	100
							40	150	120	110	130			150	120	100
							60	140	115	105	120			150	110	100
						100	130	110	100			95	80	130	95	80
Hardiplank	5/16	9.50	6d common 2" long	Through Overlap	2 x 4	16	0-15	150	120	110	140			150	130	105
							20	150	120	110	140			150	120	100
							40	140	110	100	120			140	120	95
							60	130	105	100	120			140	120	90
						100	120	100	95			90	80	115	90	80
Hardiplank	5/16	12.00	6d common 2" long	Through Overlap	2 x 4	16	0-15	140	110	95	130			150	110	95
							20	140	105	95	120			150	110	90
							40	120	100	90	110			140	100	85
							60	115	95	85	105			120	95	80
						100	110	90	80			80	70	100	80	70

Table 2b — MAXIMUM WIND SPEED

Product Type	Product (in.)		Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
	Thick.	Width						Uniform Building Code			Standard Building Code			BOCA National Building Code		
								B	C	D	< 60 ft	C	D	B	C	D
Hardiplank	5/16	4.00	6d common 2" long	Through Overlap	2 x 4	24	0-15	150	130	115	150			150	130	110
							20	150	130	110	140			150	130	110
							40	150	120	110	130			150	120	100
							60	140	120	100	120			150	115	95
							100	130	110	100		95	80	120	95	80
Hardiplank	5/16	6.00	6d common 2" long	Through Overlap	2 x 4	24	0-15	140	110	95	130			120	110	90
							20	140	100	95	120			120	110	90
							40	130	100	95	110			120	100	80
							60	115	95	85	105			120	90	80
							100	105	90	80		80	70	100	80	70
Hardiplank	5/16	6.25	6d common 2" long	Through Overlap	2 x 4	24	0-15	120	105	95	120			120	110	90
							20	120	100	90	120			120	100	85
							40	120	95	85	110			120	95	80
							60	110	90	80	100			120	90	80
							100	105	85	80		80	70	100	80	70
Hardiplank	5/16	7.50	6d common 2" long	Through Overlap	2 x 4	24	0-15	120	95	85	110			120	100	80
							20	120	95	85	110			120	95	80
							40	110	85	80	100			120	90	75
							60	100	85	75	95			120	85	70
							100	95	80	70		70	70	90	70	-
Hardiplank	5/16	8.00	6d common 2" long	Through Overlap	2 x 4	24	0-15	120	95	80	110			120	100	80
							20	120	95	80	105			120	90	70
							40	105	85	70	100			110	80	70
							60	100	85	70	90			105	80	70
							100	90	75	70		70	-	85	70	-
Hardiplank	5/16	8.25	6d common 2" long	Through Overlap	2 x 4	24	0-15	115	95	80	110			120	95	80
							20	115	95	80	100			120	90	75
							40	105	85	70	95			110	80	70
							60	100	85	70	90			105	75	70
							100	90	75	70		85	-	85	-	-
Hardiplank	5/16	9.50	6d common 2" long	Through Overlap	2 x 4	24	0-15	110	85	75	100			120	90	70
							20	110	85	70	95			120	85	70
							40	95	75	70	85			100	80	-
							60	90	75	-	85			100	70	-
							100	85	70	-		-	-	80	-	-
Hardiplank	5/16	12.00	6d common 2" long	Through Overlap	2 x 4	24	0-15	70	75	-	90			110	80	-
							20	95	70	-	85			110	75	-
							40	90	70	-	80			95	70	-
							60	80	-	-	75			85	-	-
							100	70	-	-		-	-	70	-	-
Hardiplank	5/16	4.00	No. 8-18 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	150	150	150			150	150	150
							20	150	150	150	150			150	150	140
							40	150	150	140	150			150	150	140
							60	150	150	140	150			150	150	130
							100	150	150	130		130	115	150	130	115
Hardiplank	5/16	6.00	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	150	140	150			150	150	120
							20	150	140	140	150			150	140	120
							40	150	130	130	150			150	130	115
							60	150	130	130	140			150	120	110
							100	140	120	120		105	95	135	105	95
Hardiplank	5/16	6.25	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	140	120	150			150	150	120
							20	150	140	120	150			150	140	120
							40	150	130	110	140			150	130	110
							60	150	120	110	140			150	120	105
							100	140	120	110		105	90	130	105	90
Hardiplank	5/16	7.50	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	130	110	150			150	130	110
							20	150	120	110	140			150	130	105
							40	140	110	105	130			150	115	100
							60	130	110	100	120			150	110	90
							100	120	100	95		90	80	115	90	80

Table 2b — MAXIMUM WIND SPEED

Product Type	Product (in.)		Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
	Thick.	Width						Uniform Building Code			Standard Building Code			BOCA National Building Code		
								B	C	D	< 60 ft	C	D	B	C	D
Hardiplank	5/16	8.00	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	130	110	150			150	130	110
							20	150	120	110	140			150	130	105
							40	150	110	105	130			150	115	100
							60	150	110	100	120			140	110	90
							100	130	100	95		90	80	115	90	80
Hardiplank	5/16	8.25	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	120	110	140			150	130	110
							20	150	120	110	140			150	120	105
							40	140	110	105	120			150	115	100
							60	120	110	100	120			140	105	90
							100	120	100	95		90	80	115	90	80
Hardiplank	5/16	9.50	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	150	115	100	130			150	120	100
							20	150	110	100	130			150	115	95
							40	130	110	95	120			140	105	90
							60	120	110	90	110			130	100	85
							100	115	95	85		85	75	110	85	75
Hardiplank	5/16	12.00	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	16	0-15	130	100	90	120			150	110	90
							20	130	100	90	120			150	105	80
							40	120	90	80	100			120	95	80
							60	110	90	80	100			120	90	75
							100	100	85	80		75	-	95	75	-
Hardiplank	5/16	4.00	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	150	150	130	150			150	150	120
							20	150	140	130	150			150	140	120
							40	150	130	120	150			150	130	110
							60	150	130	110	140			150	120	110
							100	140	110	110		105	90	135	105	90
Hardiplank	5/16	6.00	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	150	130	105	140			150	120	100
							20	150	130	100	130			150	120	100
							40	150	110	100	120			140	110	95
							60	140	105	90	115			130	100	90
							100	130	100	90		85	75	110	85	75
Hardiplank	5/16	6.25	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	150	120	100	135			150	150	100
							20	150	110	100	130			150	140	95
							40	130	105	90	120			140	130	90
							60	120	100	90	110			130	120	85
							100	110	95	90		85	70	110	85	75
Hardiplank	5/16	7.50	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	140	110	90	120			150	110	90
							20	130	100	90	120			150	105	90
							40	120	95	85	110			130	95	80
							60	110	90	80	100			120	90	80
							100	100	90	80		80	70	115	80	70
Hardiplank	5/16	8.00	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	130	105	90	120			150	110	90
							20	130	100	90	115			150	105	85
							40	120	95	80	105			130	95	80
							60	110	90	80	100			120	90	75
							100	100	85	80		75	-	95	75	-
Hardiplank	5/16	8.25	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	130	100	90	120			150	105	90
							20	130	100	90	115			150	105	85
							40	120	90	80	105			120	90	80
							60	110	90	80	100			115	85	75
							100	100	85	75		75	-	95	75	-
Hardiplank	5/16	9.50	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	120	95	80	110			140	100	80
							20	120	90	80	105			140	95	80
							40	110	85	75	95			120	85	75
							60	100	80	70	90			110	80	70
							100	90	80	70		70	-	90	70	-
Hardiplank	5/16	12.00	No. 8 x 1-5/8" long x 0.323" HD ribbed bugle head screw	Through Overlap	Min. No. 20 ga. x 3.62" x 1.375" Metal C-stud	24	0-15	115	80	70	100			130	90	70
							20	110	80	70	95			120	85	70
							40	95	75	70	85			100	75	-
							60	90	70	-	80			95	70	-
							100	80	70	-		-	-	80	-	-

Table 2b — MAXIMUM WIND SPEED

Product Type	Product (in.)		Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
	Thick.	Width						Uniform Building Code			Standard Building Code			BOCA National Building Code		
								B	C	D	< 60 ft	C	D	B	C	D
Hardiplank	5/16	4.00	No. 11 ga. 1-1/4" long Galv. roofing nail	Through top edge of plank	2 x 4 wood	16	0-15	150	150	150	150			150	150	150
							20	150	150	150	150			150	150	150
							40	150	150	150	150			150	150	150
							60	150	150	150	150			150	150	150
						100	150	150	150		140	120	150	140	120	
Hardiplank	5/16	6.00	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	16	0-15	150	150	130	150			150	150	130
							20	150	150	130	150			150	150	120
							40	150	140	120	150			150	130	115
							60	150	130	120	140			150	130	110
						100	150	120	110		110	95	140	110	95	
Hardiplank	5/16	6.25	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	16	0-15	150	150	130	150			150	150	120
							20	150	140	120	150			150	140	120
							40	150	130	120	150			150	130	110
							60	150	130	110	140			150	120	110
						100	140	120	110		100	95	135	100	95	
Hardiplank	5/16	7.50	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	16	0-15	150	130	115	150			150	130	110
							20	150	130	110	140			150	130	110
							40	150	120	110	135			150	120	100
							60	140	115	105	125			150	110	95
						100	130	110	100		95	85	120	95	85	
Hardiplank	5/16	8.00	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	16	0-15	150	130	110	150			150	130	105
							20	150	120	110	140			150	120	100
							40	140	115	100	130			150	115	95
							60	130	110	100	120			140	110	95
						100	120	110	95		90	80	115	90	80	
Hardiplank	5/16	8.25	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	16	0-15	150	120	110	140			150	130	105
							20	150	120	105	140			150	120	105
							40	140	110	100	125			150	110	95
							60	130	110	100	120			140	105	90
						100	120	100	95		90	80	115	90	80	
Hardiplank	5/16	9.50	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	16	0-15	150	110	100	130			150	120	100
							20	140	110	100	130			150	115	95
							40	130	100	90	115			140	100	90
							60	120	100	90	110			130	100	85
						100	110	95	80		80	70	105	80	70	
Hardiplank	5/16	12.00	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	16	0-15	130	100	90	115			150	105	85
							20	120	100	80	110			140	100	80
							40	110	90	80	100			120	95	75
							60	110	80	80	95			110	85	75
						100	100	80	75		75	-	90	75	-	
Hardiplank	5/16	4.00	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	24	0-15	150	150	140	150			150	150	130
							20	150	150	140	150			150	150	130
							40	150	150	130	150			150	140	120
							60	150	140	130	150			150	140	120
						100	150	130	120		115	105	150	115	105	
Hardiplank	5/16	6.00	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	24	0-15	150	120	110	140			150	130	105
							20	150	120	105	140			150	120	105
							40	140	110	100	125			150	110	95
							60	130	110	100	115			140	105	90
						100	120	100	100		90	80	110	90	80	
Hardiplank	5/16	6.25	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	24	0-15	150	120	110	140			150	125	100
							20	150	120	100	130			150	120	100
							40	130	110	100	120			150	110	95
							60	120	110	95	110			130	105	90
						100	120	100	90		85	80	110	85	80	
Hardiplank	5/16	7.50	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	24	0-15	140	110	95	120			150	115	90
							20	140	105	90	120			150	110	90
							40	120	100	90	110			130	100	80
							60	120	95	85	100			120	95	80
						100	110	90	70		80	70	100	80	70	

Table 2b — MAXIMUM WIND SPEED

Product Type	Product (in.)		Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
	Thick.	Width						Uniform Building Code			Standard Building Code			BOCA National Building Code		
								B	C	D	< 60 ft	C	D	B	C	D
Hardiplank	5/16	8.00	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	24	0-15	130	100	90	120			150	110	90
							20	130	100	90	115			150	105	80
							40	120	95	80	105			120	95	80
							60	120	95	80	100			110	90	75
						100	110	90	70		90	-	95	90	-	
Hardiplank	5/16	8.25	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	24	0-15	130	100	90	120			150	110	85
							20	130	100	90	110			140	105	85
							40	120	95	80	100			120	90	80
							60	110	95	80	95			110	90	75
						100	100	90	75		75	-	90	70	-	
Hardiplank	5/16	9.50	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	24	0-15	120	95	80	110			140	100	80
							20	120	90	80	105			130	90	75
							40	110	90	70	95			115	85	70
							60	100	85	70	90			105	80	70
						100	95	75	70		70	-	85	70	-	
Hardiplank	5/16	12.00	No. 11 ga. 1-1/4" long galv. roofing nail	Through top edge of plank	2 x 4 wood	24	0-15	110	80	70	90			120	85	70
							20	110	80	70	90			120	80	70
							40	100	80	70	80			105	75	-
							60	80	80	-	80			90	70	-
						100	80	80	-		-	-	80	-	-	
Hardiplank	5/16	4.00	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	16	0-15	150	150	150	150			150	150	150
							20	150	150	150	150			150	150	140
							40	150	150	150	150			150	150	130
							60	150	150	150	160			150	150	130
						100	150	140	140		-	120	110	150	120	110
Hardiplank	5/16	6	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	16	0-15	150	140	125	150			150	150	120
							20	150	140	120	150			150	140	120
							40	150	130	115	140			150	130	110
							60	150	120	110	140			150	120	105
						100	140	120	110		-	100	90	130	100	90
Hardiplank	5/16	6-1/4	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	16	0-15	150	140	120	150			150	140	125
							20	150	140	120	150			150	140	115
							40	150	130	110	140			150	130	110
							60	150	120	110	130			150	120	105
						100	135	110	100		-	100	90	130	100	90
Hardiplank	5/16	7-1/2	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	16	0-15	150	130	110	150			150	135	110
							20	150	120	105	140			150	130	100
							40	140	115	105	130			150	120	100
							60	140	100	105	130			140	110	95
						100	125	95	95		-	90	80	115	90	80
Hardiplank	5/16	8	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	16	0-15	150	125	110	140			150	130	100
							20	150	120	105	140			150	120	100
							40	140	110	100	125			140	110	90
							60	130	110	100	120			130	105	90
						100	120	100	95		-	90	85	115	90	80
Hardiplank	5/16	8-1/4	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	16	0-15	150	120	110	140			150	125	105
							20	150	120	105	130			150	120	100
							40	140	110	100	125			140	110	95
							60	130	105	95	115			130	100	90
						100	120	100	90		-	85	75	110	85	75
Hardiplank	5/16	9-1/2	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	16	0-15	150	115	100	130			150	120	100
							20	140	110	100	130			150	110	90
							40	130	105	90	120			140	100	90
							60	120	100	90	110			120	95	85
						100	110	90	85		-	85	80	100	85	80

Table 2b — MAXIMUM WIND SPEED

Product Type	Product (in.)		Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
	Thick.	Width						Uniform Building Code			Standard Building Code			BOCA National Building Code		
								B	C	D	< 60 ft	C	D	B	C	D
Hardiplank	5/16	4	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	24	0-15	150	140	125	150			150	150	120
							20	150	140	120	150			150	140	120
							40	150	130	115	140			150	130	110
							60	150	120	110	140			150	120	105
							100	140	120	110	-	100	90	130	100	90
Hardiplank	5/16	6	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	24	0-15	150	120	100	130			150	120	100
							20	150	110	100	130			150	115	95
							40	130	105	90	120			135	105	90
							60	120	100	90	110			130	100	85
							100	110	95	90	-	85	75	105	85	75
Hardiplank	5/16	6-1/4	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	24	0-15	150	115	100	130			150	120	100
							20	140	110	100	130			150	115	90
							40	130	105	95	115			140	105	90
							60	120	100	90	110			130	100	85
							100	110	95	85	-	85	70	105	85	70
Hardiplank	5/16	7-1/2	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	24	0-15	140	105	90	120			150	110	90
							20	130	100	90	115			150	100	85
							40	120	95	85	105			130	90	75
							60	110	90	80	100			120	75	75
							100	100	85	70	-	NA	NA	90	NA	NA
Hardiplank	5/16	8	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	24	0-15	130	100	90	120			150	105	85
							20	130	100	85	115			140	100	85
							40	120	90	80	100			125	90	75
							60	10	85	80	95			115	85	75
							100	100	80	75	-	75	NA	90	75	NA
Hardiplank	5/16	8-1/4	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	24	0-15	130	100	90	110			150	105	85
							20	125	100	85	110			140	100	85
							40	115	90	80	100			125	90	75
							60	105	85	80	95			110	85	75
							100	100	80	75	-	75	NA	90	75	NA
Hardiplank	5/16	9-1/2	No. 8 x 1-1/4 in. long x 0.375 in. HD ribbed waferhead screws	Through top edge of plank	Min. No. 20 ga. X 3.62" x 1.375" Metal C-stud	24	0-15	120	90	80	110			140	100	80
							20	120	90	80	105			130	90	75
							40	105	85	75	95			115	80	70
							60	100	80	75	90			105	75	70
							100	90	75	NA	-	NA	NA	85	NA	NA
Hardiplank	5/16	4.00	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	16	0-15	150	115	100	130			150	120	95
							20	140	110	95	125			150	110	95
							40	130	105	90	115			140	100	90
							60	120	100	90	110			130	95	85
							100	110	90	85		80	70	105	80	70
Hardiplank	5/16	6.00	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	16	0-15	120	90	85	110			140	95	80
							20	120	90	80	100			130	90	70
							40	105	80	75	90			110	85	70
							60	100	80	70	90			105	80	70
							100	90	75	70	-	-	90	-	-	
Hardiplank	5/16	6.25	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	16	0-15	120	90	80	100			140	95	70
							20	105	90	80	100			130	90	70
							40	105	85	70	90			110	80	70
							60	95	80	70	85			105	75	-
							100	90	75	70	-	-	90	-	-	
Hardiplank	5/16	7.50	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	16	0-15	110	80	70	90			120	85	70
							20	100	80	70	90			120	80	70
							40	90	75	-	80			100	75	-
							60	85	70	-	80			95	70	-
							100	80	70	-	-	-	75	-	-	
Hardiplank	5/16	8.00	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	16	0-15	100	80	70	90			120	80	70
							20	100	80	70	90			115	80	-
							40	90	70	-	80			100	70	-
							60	80	70	-	75			90	70	-
							100	75	-	-	-	-	70	-	-	

Table 2b — MAXIMUM WIND SPEED

Product Type	Product (in.)		Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
	Thick.	Width						Uniform Building Code			Standard Building Code			BOCA National Building Code		
								B	C	D	< 60 ft	C	D	B	C	D
Hardiplank	5/16	8.25	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	16	0-15	100	80	70	90			120	80	-
							20	100	80	70	90			110	80	-
							40	90	70	-	80			100	70	-
							60	80	70	-	75			90	70	-
						100	75	-	-	-	-	-	70	-	-	
Hardiplank	5/16	9.50	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	16	0-15	100	70	-	80			110	75	-
							20	90	70	-	80			105	70	-
							40	80	-	-	75			90	-	-
							60	80	-	-	70			85	-	-
						100	70	-	-	-	-	-	85	-	-	
Hardiplank	5/16	12.00	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	16	0-15	90	-	-	70			100	70	-
							20	80	-	-	70			90	-	-
							40	70	-	-	-			80	-	-
							60	70	-	-	-			70	-	-
						100	-	-	-	-	-	-	-	-	-	
Hardiplank	5/16	4.00	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	24	0-15	120	90	80	110			140	95	80
							20	120	90	80	105			130	90	75
							40	105	85	75	90			110	85	70
							60	100	80	70	90			105	80	70
						100	90	75	-	-	-	-	90	-	-	
Hardiplank	5/16	6.00	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	24	0-15	100	70	-	90			115	80	-
							20	90	70	-	85			115	75	-
							40	85	70	-	75			90	70	-
							60	80	-	-	70			85	-	-
						100	70	-	-	-	-	-	70	-	-	
Hardiplank	5/16	6.25	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	24	0-15	100	70	-	85			110	75	-
							20	90	70	-	80			105	70	-
							40	85	-	-	75			90	-	-
							60	80	-	-	70			80	-	-
						100	70	-	-	-	-	-	70	-	-	
Hardiplank	5/16	7.50	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	24	0-15	90	70	-	80			105	70	-
							20	85	70	-	75			100	70	-
							40	80	-	-	70			85	-	-
							60	70	-	-	-			80	-	-
						100	70	-	-	-	-	-	-	-	-	
Hardiplank	5/16	8.00	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	24	0-15	80	-	-	70			100	-	-
							20	80	-	-	70			90	-	-
							40	75	-	-	-			80	-	-
							60	70	-	-	-			70	-	-
						100	-	-	-	-	-	-	-	-	-	
Hardiplank	5/16	8.25	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	24	0-15	80	-	-	70			100	-	-
							20	80	-	-	70			90	-	-
							40	75	-	-	-			80	-	-
							60	70	-	-	-			70	-	-
						100	-	-	-	-	-	-	-	-	-	
Hardiplank	5/16	9.50	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	24	0-15	80	-	-	70			90	-	-
							20	70	-	-	-			80	-	-
							40	-	-	-	-			70	-	-
							60	-	-	-	-			70	-	-
						100	-	-	-	-	-	-	-	-	-	
Hardiplank	5/16	12.00	0.089" shank x 0.221" HD x 2" long galv. siding nail	Through overlap	2 x 4	24	0-15	70	-	-	-			80	-	-
							20	-	-	-	-			80	-	-
							40	-	-	-	-			-	-	-
							60	-	-	-	-			-	-	-
						100	-	-	-	-	-	-	-	-	-	
Hardiplank	5/16	4.00	0.093" shank x 0.222" HD x 2" long galv. siding nail	Through top edge of plank	2 x 4	16	0-15	150	130	110	150			150	130	110
							20	150	120	110	140			150	130	105
							40	140	115	100	130			150	115	100
							60	140	110	100	120			140	110	95
						100	125	100	95		90	80	110	90	80	



Table 2b — MAXIMUM WIND SPEED

Product Type	Product (in.)		Fastener Type	Fastener Spacing (in.)	Frame Type <sup>1</sup>	Stud Spacing (in.)	Height of Bldg (ft)	Maximum Basic Wind Speed (Mph) for Exposure Category								
	Thick.	Width						Uniform Building Code			Standard Building Code			BOCA National Building Code		
								B	C	D	< 60 ft	C	D	B	C	D
Hardiplank	5/16	8.25	0.093" shank x 0.222" HD x 2" long galv. siding nail	Through top edge of plank	2 x 4	24	0-15	85	-	-	70			100	70	-
							20	85	-	-	70			95	-	-
							40	70	-	-	-			85	-	-
							60	70	-	-	-			75	-	-
							100	-	-	-	-			-	-	-
Hardiplank	5/16	9.50	0.093" shank x 0.222" HD x 2" long galv. siding nail	Through top edge of plank	2 x 4	24	0-15	80	-	-	70			90	-	-
							20	80	-	-	70			90	-	-
							40	70	-	-	-			75	-	-
							60	-	-	-	-			70	-	-
							100	-	-	-	-			-	-	-
Hardiplank	5/16	12.00	0.093" shank x 0.222" HD x 2" long galv. siding nail	Through top edge of plank	2 x 4	24	0-15	70	-	-	-			70	-	-
							20	-	-	-	-			80	-	-
							40	-	-	-	-			-	-	-
							60	-	-	-	-			-	-	-
							100	-	-	-	-			-	-	-
Hardiplank	5/16	9.50	0.091" shank, 0.221" HD, 1.5" long corrosion resistant nail	Face nailed through the overlap @ 12" o.c.	7/16" thick APA rated OSB sheathing or equivalent solid sheathing	-	0-15	100	80	-	90			115	80	-
							20	95	75	-	85	-		110	75	-
							40	85	70	-	80	-		90	70	-
							60	80	-	-	75	-		85	-	-
							100	70	-	-	-	-		70	-	-

Notes to Table 2b:

1. Values are for species of wood having a specific gravity of 0.42 or greater, unless otherwise noted.

Table 3 — SHEAR VALUES ALLOWABLE LOADS IN POUNDS PER LINEAL FOOT FOR PANEL SHEAR WALLS<sup>1,2</sup>

Product Type	Product Thickness (inch)	Fastener Type	Fastener Spacing (inch)	Frame Types	Stud Spacing (inch)	Shear Value (plf)
Hardiflex Hardisoffit	3/16	4d common 1-1/2 in. long	6	2 x 4 wood <sup>5</sup>	16	145
Hardipanel Hardiflex Hardisoffit	1/4	4d common 1-1/2 in. long	8	2 x 4 wood <sup>5</sup>	16 & 24	120
Hardibacker Titan	1/4	0.086 in. x 1-3/8 in. long gypsum wall board nail	6	2 x 4 wood <sup>5</sup>	16 & 24	140
Hardipanel Hardiflex	1/4	6d common 2 in. long	6	2 x 4 wood <sup>5</sup>	16	190
Hardipanel Hardiflex Harditex Hardibacker Titan	1/4	No. 11 ga. 1-1/4 in. long galvanized roofing nail	6	2 x 4 wood <sup>5</sup>	16 & 24	180
Hardipanel Hardiflex Harditex Hardibacker Titan	1/4	No. 11 ga. 1-1/4 in. long galvanized roofing nail	4 edge 12 field	2 x 4 wood <sup>5</sup>	16 & 24	265
Hardipanel Hardiflex Harditex Hardibacker Titan	1/4	No. 11 ga. 1-1/4 in. long galvanized roofing nail	3 edge 6 field	2 x 4 wood <sup>5</sup> w/48 in. mid-height block	16 & 24	295
Shiplap	5/16	0.092 in. shank, 0.225 in. HD, 2 in. long ring shank nail	3 edge 8 field	2 x 4 wood <sup>4</sup>	16	268
Shiplap	5/16	0.092 in. shank, 0.225 in. HD, 2 in. long ring shank nail	4 edge 8 field	2 x 4 wood <sup>4</sup>	16	238
Shiplap	5/16	0.092 in. shank, 0.225 in. HD, 2 in. long ring shank nail	5 edge 8 field	2 x 4 wood <sup>4</sup>	16	208
Shiplap	5/16	0.092 in. shank, 0.225 in. HD, 2 in. long ring shank nail	6 edge 8 field	2 x 4 wood <sup>4</sup>	16	179
Shiplap	5/16	0.092 in. shank, 0.225 in. HD, 2 in. long ring shank nail	7 edge 8 field	2 x 4 wood <sup>4</sup>	16	149
Shiplap	5/16	0.092 in. shank, 0.225 in. HD, 2 in. long ring shank nail	8 edge 8 field	2 x 4 wood <sup>4</sup>	16	119
Hardipanel Hardiflex	5/16	0.091 in. shank, 0.225 in. HD, 1.5 in. long ring shank nail	4 edge 8 field	2 x 4 wood <sup>3</sup>	16	198
Hardipanel Hardiflex	5/16	4d common 1-1/2 in. long	8	2 x 4 wood <sup>5</sup>	16 & 24	120
Hardipanel Hardiflex	5/16	6d common 2 in. long	6	2 x 4 wood <sup>5</sup>	16	200
Hardipanel Hardiflex	5/16	6d common 2 in. long	6	2 x 4 wood <sup>5</sup>	24	153
Hardipanel Hardiflex	5/16	6d common 2 in. long	4	2 x 4 wood <sup>5</sup>	16	233
Hardipanel Hardiflex	5/16	6d common 2 in. long	4	2 x 4 wood <sup>5</sup>	24	212
Hardipanel Hardiflex	5/16	6d common 2 in. long	6 edge 12 field	2 x 4 wood <sup>5</sup>	16	157
Hardipanel Hardiflex	5/16	6d common 2 in. long	6 edge 12 field	2 x 4 wood <sup>5</sup>	24	145
Hardipanel Hardiflex Harditex Hardibacker	5/16	No. 11 ga. 1-1/2 in. long galvanized roofing nail	6	2 x 4 wood <sup>5</sup>	16	200
Hardipanel Hardiflex Harditex Hardibacker	5/16	No. 11 ga. 1-1/2 in. long galvanized roofing nail	4 edge 12 field	2 x 4 wood <sup>5</sup>	16	280

Table 3 — SHEAR VALUES ALLOWABLE LOADS IN POUNDS PER LINEAL FOOT FOR PANEL SHEAR WALLS<sup>1,2</sup>

Product Type	Product Thickness (inch)	Fastener Type	Fastener Spacing (inch)	Frame Types	Stud Spacing (inch)	Shear Value (plf)
Hardipanel Hardiflex Harditex Hardibacker	5/16	No. 11 ga. 1-1/2 in. long galvanized roofing nail	3 edge 6 field	2 x 4 wood <sup>5</sup> w/48 in. mid-height block	16	340
Hardiflex Hardipanel Harditex Hardibacker Titan	7/16	No. 11 ga. 1-3/4 in. long galvanized roofing nail	6	2 x 4 wood <sup>5</sup>	16	280
Hardiflex Hardisoffit	3/16	Min. No. 8 x 1 in. long x 0.323 in. HD ribbed buglehead screws	6	Min. No. 20 ga. x 3-5/8 in. x 1-3/8 in. metal C-stud	16	140 <sup>6</sup>
Hardipanel Hardiflex Harditex Hardibacker Titan	1/4	Min. No. 8 x 1 in. long x 0.323 in. HD ribbed buglehead screws	6	Min. No. 20 ga. x 3-5/8 in. x 1-3/8 in. metal C-stud	16 & 24	125 <sup>6</sup>
Hardipanel Hardiflex Harditex Hardibacker	5/16	Min. No. 8 x 1 in. long x 0.323 in. HD ribbed buglehead screws	6	Min. No. 20 ga. x 3-5/8 in. x 1-3/8 in. metal C-stud	16	160 <sup>6</sup>
Hardipanel Hardiflex Harditex Hardibacker Titan	7/16	Min. No. 8 x 1 in. long x 0.311 in. HD ribbed buglehead screws	6	Min. No. 20 ga. x 3-5/8 in. x 1-3/8 in. metal C-stud	16	162 <sup>6</sup>
Hardipanel Hardiflex Harditex	5/16	ET & F 1-1/2 in. long x 0.10" knurled shank x 0.25" HD pin fastener (AKN100-0150NA)	4 edge 8 field	Min. No. 20 ga. x 3-5/8 in. x 1-3/8 in. metal C-stud	16	154
Hardipanel Hardiflex Harditex	5/16	ET & F 1-1/2 in. long x 0.10" knurled shank x 0.25" HD pin fastener (AKN100-0150NA)	4 edge 8 field	Min. No. 20 ga. x 3-5/8 in. x 1-3/8 in. metal C-stud	24	133

- All board edges shall be supported by framing. Panels shall be applied with the long dimension either parallel or perpendicular to studs.
- The maximum height-to-length ratio for construction in this Table is 2:1.
- Values are for species of wood having a specific gravity of 0.36 or greater.
- Values are for species of wood having a specific gravity of 0.40 or greater.
- Values are for species of wood having a specific gravity of 0.42 or greater, unless otherwise noted.
- Under the *Uniform Building Code*<sup>TM</sup>, these steel-framed assemblies are limited to wind load resistance only.
- 1 inch = 25.4 mm, 1plf = 14.59 N/m

Table 4 — "K" and "R" VALUES FOR FIBER-CEMENT PRODUCTS

Product Thickness <sup>3</sup> (inch)	Thermal Conductivity <sup>1</sup> Keff = Btu/hr-ft <sup>2</sup> -EF	Thermal Resistance <sup>1</sup> R = 1/Keff	Actual Thermal Conductivity <sup>2</sup> (Keff)	Actual Thermal Resistance <sup>2</sup> (®)
1/4	1.95	0.51	7.80	0.13
5/16	2.07	0.48	6.62	0.15
3/8	2.18	0.46	5.81	0.17
13/32	8.39	0.12	20.07	0.05
7/16	2.30	0.44	5.26	0.19

**Notes to Table 4:**

- Based on 1 inch of panel thickness.
- Actual value for panel thickness shown.
- SI units conversion: 1 inch = 25.4 mm, 1 Btu/h-ft<sup>2</sup>-EF = 5.678 W/m<sup>2</sup>-K

**Table 5 — PERMEANCE VALUES FOR FIBER-CEMENT PRODUCTS**

Product Thickness <sup>1</sup> (inch)	Permeance (perms)
1/4	1.75
5/16	1.54
3/8	1.32
13/32	2.84
7/16	1.10

**Note to Table 5:**

1. SI units conversion: 1 inch = 25.4 mm, 1 perm = 57 mg/(s•m<sup>2</sup>•Pa)

**Table 6A**  
**BOCA® National Building Code/1999**  
**ALLOWABLE BASIC WIND SPEEDS (MILES PER HOUR) FOR**  
**HARDISHINGLE™ CLADDING EXTERIOR WALL FINISH**

Sheathing Type	Fastener Type	Weather Exposure and Fastener Location	Height of Building (feet)	Exposure Category	
				B	C
Minimum 15/32 inch thick plywood complying with DOC PS 1-95	Min. 0.121 in. shank x 0.371 in. HD x 1-1/4 in. long corrosion resistant roofing nail	8 inch exposure 2 roofing nails 9 inches from butt edge	0-15	110	95
			20	110	90
			40	110	80
			60	110	75
			100	80	
			200	70	
		7 inch exposure 2 roofing nails 8 inches from butt edge	0-15	110	110
			20	110	105
			40	110	95
			60	110	90
			100	95	75
			200	80	70
6 inch exposure 2 roofing nails 7 inches from butt edge	0-15	110	110		
	20	110	110		
	40	110	105		
	60	110	100		
	100	105	85		
	200	90	75		

**Table 6B**  
**SBCCI - 1999 Standard Building Code©**  
**ALLOWABLE BASIC WIND SPEEDS (MILES PER HOUR) FOR**  
**HARDISHINGLE™ CLADDING EXTERIOR WALL FINISH**

Sheathing Type	Fastener Type	Weather Exposure and Fastener Location	Height of Building (feet)	Exposure Category	
				Standard	Coastal
Minimum 15/32 inch thick plywood complying with DOC PS 1-95	Min. 0.121 in. shank x 0.371 in. HD x 1-1/4 in. long corrosion resistant roofing nail	8 inch exposure 2 roofing nails 9 inches from butt edge	0-15	105	105
			20	100	100
			40	90	90
			60	85	85
		7 inch exposure 2 roofing nails 8 inches from butt edge	0-20	110	110
			40	100	100
			60	95	95
			0-60	110	110
		6 inch exposure 2 roofing nails 7 inches from butt edge	100	75	75
			200	70	70

**Table 6C**  
**ICBO - 1997 Uniform Building Code™**  
**ALLOWABLE BASIC WIND SPEEDS (MILES PER HOUR) FOR**  
**HARDISHINGLE™ CLADDING EXTERIOR WALL FINISH**

Sheathing Type	Fastener Type	Weather Exposure and Fastener Location	Height of Building (feet)	Exposure Category	
				B	C
Minimum 15/32 inch thick plywood complying with DOC PS 1-95	Min. 0.121 in. shank x 0.371 in. HD x 1-1/4 in. long corrosion resistant roofing nail	8 inch exposure 2 roofing nails 9 inches from butt edge	0-20	110	90
			40	100	80
			60	95	75
		7 inch exposure 2 roofing nails 8 inches from butt edge	100	90	70
			200	80	70
			0-20	110	105
		6 inch exposure 2 roofing nails 7 inches from butt edge	40	110	95
			60	110	90
			100	105	85
			200	95	80
			0-20	110	110
			40	110	105
			60	110	100
			100	110	95
			200	100	90

**Notes to Tables 6A, 6B and 6C:**

1. Table values are based on an importance factor of 1.0
2. 1 foot = 305 mm, 1 inch = 25.4 mm, 1 mph = 1.6 km/h

**Table 7A**  
**BOCA® National Building Code/1999**  
**ALLOWABLE BASIC WIND SPEEDS (MILES PER HOUR) FOR**  
**HARDISHINGLE™ CLADDING EXTERIOR WALL FINISH**

Sheathing Type	Fastener Type	Weather Exposure and Fastener Location	Height of Building (feet)	Exposure Category	
				B	C
Minimum 7/16 inch thick OSB sheathing complying with DOC-PS 2-95	Min. 0.091 in. shank x 0.221 in. HD x 1-1/2 in. long corrosion resistant siding nail	8 inch exposure 2 siding nails 9 inches from butt edge	0-15	110	75
			20	110	75
			40	90	70
		7 inch exposure 2 siding nails 8 inches from butt edge	60	85	70
			0-15	110	90
			20	110	85
		6 inch exposure 2 siding nails 7 inches from butt edge	40	105	80
			60	100	75
			0-15	110	100
			20	110	95
			40	110	90
			60	110	80
			100	85	70
			200	75	70

**Table 7B**  
**SBCCI - 1999 Standard Building Code®**  
**ALLOWABLE BASIC WIND SPEEDS (MILES PER HOUR) FOR**  
**HARDISHINGLE™ CLADDING EXTERIOR WALL FINISH**

Sheathing Type	Fastener Type	Weather Exposure and Fastener Location	Height of Building (feet)	Exposure Category	
				Standard	Coastal
Minimum 7/16 inch thick OSB sheathing complying with DOC-PS 2-95	Min. 0.091 in. shank x 0.221 in. HD x 1-1/2 in. long corrosion resistant siding nail	8 inch exposure 2 siding nails 9 inches from butt edge	0-20	85	85
			40	75	75
			60	70	70
		7 inch exposure 2 siding nails 8 inches from butt edge	100	100	100
			20	95	95
			40	85	85
		6 inch exposure 2 siding nails 7 inches from butt edge	60	80	80
			0-20	110	110
			40	105	105
			60	100	100
			100	70	70

**Table 7C**  
**ICBO - 1997 Uniform Building Code™**  
**ALLOWABLE BASIC WIND SPEEDS (MILES PER HOUR) FOR**  
**HARDISHINGLE™ CLADDING EXTERIOR WALL FINISH**

Sheathing Type	Fastener Type	Weather Exposure and Fastener Location	Height of Building (feet)	Exposure Category	
				B	C
Minimum 7/16 inch thick OSB sheathing complying with DOC-PS 2-95	Min. 0.091 in. shank x 0.221 in. HD x 1-1/2 in. long corrosion resistant siding nail	8 inch exposure 2 siding nails 9 inches from butt edge	0-15	100	75
			20	90	70
			40	85	
			60	80	
			100	70	
		7 inch exposure 2 siding nails 8 inches from butt edge	0-15	110	90
			20	110	85
			40	100	80
			60	90	75
6 inch exposure 2 siding nails 7 inches from butt edge	100	85	70		
	200	70			
	0-20	110	95		
	40	110	85		
	60	105	80		
		100	80		
		200	70		

**Notes to Tables 7A, 7B, and 7C:**

1. Table values are based on an importance factor of 1.0
2. 1 foot = 305 mm, 1 inch = 25.4 mm, 1 mph = 1.6 km/h

**Table 8A**  
**BOCA® National Building Code/1999**  
**ALLOWABLE BASIC WIND SPEEDS (MILES PER HOUR) FOR**  
**HARDISHINGLE™ CLADDING EXTERIOR WALL FINISH**

Sheathing Type	Fastener Type	Weather Exposure and Fastener Location	Height of Building (feet)	Exposure Category	
				B	C
Minimum 7/16 inch thick OSB sheathing complying with DOC-PS 2-95	Min. 0.091 in. shank x 0.221 in. HD x 1-1/2 in. long corrosion resistant siding nail	8 in. exposure 3 siding nails per 12 in. wide, 9 in. from butt edge, 2 siding nails per 6 & 8 in. wide	0-15	110	90
			20	110	85
			40	100	75
			60	95	70
			100	75	
		7 in. exposure 3 siding nails per 12 in. wide, 8 inches from butt edge, 2 siding nails per 6 & 8 in. wide	0-15	110	105
			20	110	100
			40	110	90
			60	110	85
		6 in. exposure 3 siding nails per 12 in. wide, 7 inches from butt edge, 2 siding nails per 6 & 8 in. wide	100	90	70
			200	80	
			0-20	110	110
			40	110	100
			60	110	90
				100	80
		200	85		
		200	70		

**Table 8B**  
**SBCCI - 1999 Standard Building Code®**  
**ALLOWABLE BASIC WIND SPEEDS (MILES PER HOUR) FOR**  
**HARDISHINGLE™ CLADDING EXTERIOR WALL FINISH**

Sheathing Type	Fastener Type	Weather Exposure and Fastener Location	Height of Building (feet)	Exposure Category		
				Standard	Coastal	
Minimum 7/16 inch thick OSB sheathing complying with DOC-PS 2-95	Min. 0.091 in. shank x 0.221 in. HD x 1-1/2 in. long corrosion resistant siding nail	8 in. exposure 3 siding nails per 12 in. wide, 9 in. from butt edge, 2 siding nails per 6 & 8 in. wide	0-15	100	100	
			20	95	95	
			40	85	85	
			60	80	80	
			7 in. exposure 3 siding nails per 12 in. wide, 8 inches from butt edge, 2 siding nails per 6 & 8 in. wide	0-15	110	110
				20	105	105
		40		95	95	
		60		90	90	
		6 in. exposure 3 siding nails per 12 in. wide, 7 inches from butt edge, 2 siding nails per 6 & 8 in. wide		0-15	110	110
				20	110	110
			40	110	110	
			60	105	105	
100	105		105			
100	70		70			

**Table 8C**  
**ICBO - 1997 Uniform Building Code™**  
**ALLOWABLE BASIC WIND SPEEDS (MILES PER HOUR) FOR**  
**HARDISHINGLE™ CLADDING EXTERIOR WALL FINISH**

Sheathing Type	Fastener Type	Weather Exposure and Fastener Location	Height of Building (feet)	Exposure Category		
				B	C	
Minimum 7/16 inch thick OSB sheathing complying with DOC-PS 2-95	Min. 0.091 in. shank x 0.221 in. HD x 1-1/2 in. long corrosion resistant siding nail	8 in. exposure 3 siding nails per 12 in. wide, 9 in. from butt edge, 2 siding nails per 6 & 8 in. wide	0-15	110	85	
			20	110	80	
			40	100	75	
			60	90	70	
			100	80	70	
			200	70	70	
			7 in. exposure 3 siding nails per 12 in. wide, 8 inches from butt edge, 2 siding nails per 6 & 8 in. wide	0-15	110	110
				20	110	105
				40	110	100
		60		110	95	
		100		100	80	
		200		90	75	
		6 in. exposure 3 siding nails per 12 in. wide, 7 inches from butt edge, 2 siding nails per 6 & 8 in. wide	0-15	110	110	
			20	110	105	
			40	110	100	
			60	110	95	
			100	105	90	
			200	95	85	

**Notes to Tables 8A, 8B, and 8C:**

1. Table values are based on an importance factor of 1.0
2. 1 foot = 305 mm, 1 inch = 25.4 mm, 1 mph = 1.6 km/h

**Table 9A**  
**SBCCI - 1999 Standard Building Code®**  
**Allowable Fastener Spacing (in.)**  
**Hardiplank Lap Siding fastened to ASTM C90 Concrete Wall**

Height of Building (feet)	6-1/4 and 6 inch wide Hardiplank	7-1/2 inch wide Hardiplank	8-1/4 and 8 inch wide Hardiplank	9-1/2 inch wide Hardiplank
0-15	18.25	14.5	13.75	11.5
20	16.5	13.25	12.25	10.5
30	14.75	11.75	11	9.25
40	13.5	10.75	10.25	8.5
50	12.75	10.25	9.5	8
60	12.25	9.75	9	7.5

**Table 9B**  
**BOCA® National Building Code/1999**  
**Allowable Fastener Spacing (in.)**  
**Hardiplank Lap Siding fastened to ASTM C90 Concrete Wall**

Height of Building (feet)	6-1/4 and 6 inch wide Hardiplank		7-1/2 inch wide Hardiplank		8-1/4 and 8 inch wide Hardiplank		9-1/2 inch wide Hardiplank	
	Exposure B	Exposure C	Exposure B	Exposure C	Exposure B	Exposure C	Exposure B	Exposure C
0-15	24.0	15.0	24.0	12.0	24.0	11.25	20.25	9.5
20	24.0	13.75	23.0	11.0	21.5	10.25	18.25	8.75
40	21.0	11.25	16.75	9.0	15.75	8.5	13.25	7.25
60	17.75	10.0	14.25	8.0	13.25	7.5	11.25	6.25
100	14.0	8.75	11.25	7.0	10.5	6.5	8.75	5.5

**Table 9C**  
**ICBO - 1997 Uniform Building Code™**  
**Allowable Fastener Spacing (in.)**  
**Hardiplank Lap Siding fastened to ASTM C90 Concrete Wall**

Height of Building (feet)	6-1/4 and 6 inch wide Hardiplank		7-1/2 inch wide Hardiplank		8-1/4 and 8 inch wide Hardiplank		9-1/2 inch wide Hardiplank	
	Exposure B	Exposure C	Exposure B	Exposure C	Exposure B	Exposure C	Exposure B	Exposure C
0-15	24.0	14.25	19.25	11.25	18.0	10.5	15.25	9.0
20	22.5	13.25	18.0	10.5	16.75	9.75	14.25	8.25
40	17.75	11.5	14.25	9.25	13.5	8.5	11.25	7.25
60	15.75	10.5	12.75	8.5	11.75	8.0	10.0	6.75
100	13.25	9.25	10.5	7.5	9.75	7.0	8.25	5.75

**Notes to Table 9A, 9B, and 9C:**

1. Fasteners shall be ET&F Fastening Systems, Inc. Erico Stud nail, ET & F No. ASM-144-125, head dia. = 0.30 in., shank dia. = 0.14 in.
2. Maximum basic wind speed shall be 110 mph.
3. Exposure Category C (for Table 9A).
4. 1 inch = 25.4 mm, 1 foot = 305 mm.