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## **ANSI/SBCA FS 100–2012**

### **Standard Requirements for Wind Pressure Resistance of Foam Plastic Insulating Sheathing Used in Exterior Wall Covering Assemblies**

**Approved American National Standard  
October 2012**

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## ***Acknowledgements***

This *American National Standard* establishes wind pressure resistance requirements for foam plastic insulating sheathing (FPIS) products used as exterior wall sheathing, including use as continuous insulation in exterior wall covering assemblies for the purpose of demonstrating wind pressure performance. This includes performance testing, analysis and quality control procedures.

In this endeavor, SBCA worked in concert with the Foam Sheathing Committee (FSC) of the American Chemistry Council whose mission is to develop solutions to building code issues and promote the proper technical use of foam sheathing to the construction industry. Thanks are extended to the members of FSC and the FS 100 Project Committee for their hard work and commitment to achieving this consensus standard.

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## ANSI/SBCA FS 100–2012

### Standard Requirements for Wind Pressure Resistance of Foam Plastic Insulating Sheathing Used in Exterior Wall Covering Assemblies

*Note: User notes are not mandatory parts of this standard, but are provided to give the user some guidance on the intent of the mandatory language.*

**1.1 Scope.** This standard establishes wind pressure resistance requirements for *Foam Plastic Insulating Sheathing (FPIS)* products used as *exterior wall sheathing*, including use as continuous insulation, in *exterior wall covering assemblies*.

1.1.1 *FPIS* products shall resist design transverse wind loads acting on exterior wall assemblies as provided in Section 4.0, except as limited in Section 1.2.

1.1.2 Section 6.0 provides requirements for establishment and use of wind pressure resistance values for *FPIS* products in *blocked* and *unblocked* installations.

1.1.3 Quality assurance shall be provided by an *approved agency* in accordance with Section 7.0.

*User Note: For information on the definition of continuous insulation, see ASHRAE 90.1.*

**1.2 Limitations.** The scope of this standard is limited to exterior applications where the *FPIS* product is used as an *exterior wall sheathing* that is required to resist transverse wind loading only. The following applications are excluded from the scope of this standard:

1. Applications of *FPIS* products that are intended to provide structural functions in addition to transverse wind load resistance of a wall assembly, such as in-plane racking shear resistance (wall bracing), in-plane uplift resistance, and buckling restraint of studs or columns.
2. Applications of *FPIS* products used in contact with and over sheathing and its fastening capable of independently resisting wind loads (see *over-sheathing*), used in contact with and under sheathing and its fastening capable of independently resisting wind loads, used on interior building walls, or used on the interior side of exterior walls behind an interior finish material.
3. Applications where *FPIS* is used as part of an *Exterior Insulating Finish System*.

**1.3 Additional Considerations.** Wall assemblies including *FPIS* products shall comply with the applicable building code.

*User Note: Refer to Commentary C1.3 for guidance on end use and code compliance considerations related to use of FPIS products on exterior wall assemblies, including:*

*Cladding attachment*  
*Fire safety*  
*Thermal resistance*  
*Water resistive barrier performance*  
*Wind-borne debris resistance*

**1.4 Material Requirements.** *FPIS* products used in accordance with this standard shall comply with the following material standards, as applicable, and the additional quality assurance requirements of Section 7.0:

- *Expanded polystyrene (EPS)* – ASTM C578
- *Extruded polystyrene (XPS)* – ASTM C578
- *Polyisocyanurate (Polyiso)* – ASTM C1289

**1.5 Alternative Methods of Compliance.** The provisions of this standard are not intended to prevent use of alternative methods of compliance as permitted by the applicable building code. Alternate methods shall comply with the intent of this standard and shall be at least the equivalent of that prescribed in this standard for wind pressure resistance qualification and quality assurance.

## 2.0 Reference Standards

ASCE 7-05 – *Minimum Design Loads for Buildings and Other Structures*

ASCE 37-02 – *Design Loads on Structures during Construction*

ASTM C203-5a – *Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation*

ASTM C578-11 – *Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation*

ASTM C1289-11 – *Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*

ASTM C1396-11 – *Standard Specification for Gypsum Wallboard*

ASTM E330-09 – *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

ASTM E1233-06 – *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Cyclic Air Pressure Differential*

DOC PS2-10 – *Performance Standard for Wood-Based Structural-Use Panels*

## 3.0 Definitions

**Approved Agency:** An established independent, qualified and recognized agency regularly engaged in conducting tests or furnishing independent (third-party) inspection services.

**Blocked:** Refers to *FPIS* installation practice whereby all edges are supported on a framing member or blocking. See also “unblocked”.

**Exterior Insulating Finish System (EIFS):** A lightweight synthetic wall cladding that includes foam plastic insulation and thin synthetic coatings.

**Exterior Wall Covering:** A material or assembly of materials applied on the exterior side of exterior walls for the purpose of providing a weather-resisting barrier, insulation or for aesthetics, including but not limited to, veneers, siding, exterior insulation and finish systems, architectural trim and embellishments such as cornices, soffits, fascia, gutters and leaders.

**Exterior Wall Sheathing:** A material in board or panel form attached directly to wall framing on the exterior side of an exterior wall assembly.

**Extruded Expanded Polystyrene (XPS) Thermal Insulation:** A cellular plastic product, with or without facings, manufactured in a one-stage process by extrusion and expansion of the base polymer in the presence of blowing agent(s) resulting in a product that is rigid with a closed cellular structure. Refer to ASTM C578 for additional information.

**Faced Rigid Cellular Polyisocyanurate (Polyiso) Thermal Insulation:** A cellular plastic product formed using polyurethane-modified polyisocyanurate encapsulated between *facer* materials. Refer to ASTM C1289 for additional information.

**Facer:** An integral material permanently applied to the face of one or both surfaces of the *FPIS* product evaluated in accordance with this standard.

**Foam Plastic Insulating Sheathing (FPIS):** For the purpose of this standard, Foam Plastic Insulating Sheathing is a wall sheathing material in board or panel form consisting of foam plastic material complying with ASTM C578 or ASTM C1289, including *facers* as applicable, with a minimum thermal resistance of  $R_2$  ( $\text{ft}^2 \text{ } ^\circ\text{F h/Btu}$ ) at  $75^\circ\text{F}$  mean temperature.

**Mean Roof Height:** The average of the height of the roof at the eave and the height at the highest point on the roof surface, except that, for roof angles less than or equal to  $10^\circ$ , the mean roof height is permitted to be taken as the roof eave height. Height is measured relative to the grade plane.

**Molded Expanded Polystyrene (EPS) Thermal Insulation:** A cellular plastic product, with or without facings, manufactured from pre-expanded polystyrene beads subsequently molded into desired shapes and sizes resulting in a product that is rigid with closed cellular structure. Refer to ASTM C578 for additional information.

**Over-sheathing:** Application of *FPIS* over and directly on the surface of wall sheathing material or solid wall construction, such as masonry or concrete, whereby the substrate is capable of resisting the full design transverse wind load required by the applicable building code or latest edition of the ASCE 7 standard.

**Sample:** A set of *specimens* analyzed together.

**Specimen:** The individual test piece or assembly.

**Transverse Wind Pressure Resistance:** Resistance to wind pressure acting perpendicular (transverse) to the plane of a wall as differentiated from other wind load effects, such as in-plane (racking) shear force acting horizontally in the length direction of a wall, or wind uplift force acting vertically on a wall.

**Unblocked:** Refers to an *FPIS* installation whereby an edge is not supported by blocking or framing members.



## 4.0 Design Wind Load Requirements

**4.1 Prescribed Design Wind Loads.** *FPIS* shall resist the component and cladding design wind load shown in Table 1 as applicable to the design wind speed and wind exposure of the intended end-use.

**TABLE 1: Components and Cladding Design Wind Pressure Loads (PSF)<sup>1,2,3,4</sup>**

Design Wind Speed (mph, gust) and Exposure	85/B	90/B	100/B	110/B	120/B	130/B	140/B	150/B
	-	-	85/C	90/C	100/C	110/C	120/C	130/C
	-	-	-	85/D	90/D	100/D	110/D	120/D
Negative Pressure (Suction) Design Wind Load	-17.4	-19.5	-24.4	-29.1	-34.7	-40.7	-48.6	-57.6
Positive Pressure Design Wind Load	13.0	14.6	18.2	21.8	25.9	30.5	36.3	43.0

**TABLE NOTES:**

1. Tabulated wind pressures are for *mean roof height* not exceeding 30 feet (measured vertically from grade plane to middle of roof slope, enclosed buildings, and importance factor equal to 1.0. For other conditions of use, calculate wind load in accordance with Section 4.2.
2. Refer to the applicable building code or the ASCE 7 standard for wind exposure descriptions (B = suburban/wooded terrain; C = open flat terrain; D = ocean/lake exposure).
3. Where topographic effects occur (e.g., wind speed up due to hill-top exposure), wind load shall be calculated in accordance with Section 4.2.
4. Tabulated wind pressures are for wall corner zones using an effective wind tributary area of 10 square feet. For lesser design wind pressures away from wall corner zones, refer to the applicable building code or the ASCE 7 standard.

*User Note: Table 1 wind speed and wind pressures are based on ASCE 7-05. Wind speed conversions are required for use with codes based on wind speed map in the ASCE 7-10 standard. An appropriate conversion can be achieved by multiplying the wind speed values in the heading of Table 1 by 1.26. Refer to commentary Section C4.0 for additional guidance.*

**4.2 Calculated Design Wind Loads.** As an alternative to prescribed wind loads provided in Section 4.1, the applicable components and cladding wind load shall be permitted to be calculated in accordance with the applicable building code or the ASCE 7 standard using an effective wind tributary area of 10 square feet.

## 5.0 Installation Conditions

Installation conditions shall comply with the following:

1. Light-frame wall construction shall have a minimum framing member thickness of 1-1/2 inches for wood framing or flange width of 1-1/2 inches for cold-formed steel framing.
2. Wall stud spacing shall not exceed 24 inches on center.
3. All *FPIS* sheathing edges shall be supported by wall framing or blocking unless *unblocked* construction is specifically addressed by *FPIS* manufacturer's installation instructions.
4. For applications of *FPIS* where its fastening is intended to resist full transverse negative design wind load independent of the cladding material and cladding fastening, *FPIS* shall be attached to wall framing in accordance with the *FPIS* manufacturer's installation instructions for this application, and in accordance with Sections 6.6.2 and 7.4.2.

5. For applications where the *FPIS* attachment is not capable of independently resisting negative design wind pressures in accordance with Section 4, exterior cladding shall be provided to secure the *FPIS* to the wall framing. Where cladding is used to secure *FPIS* to the wall framing, the cladding and cladding attachment shall be structurally adequate to resist the negative design wind pressure in accordance with Section 4. Installation of the cladding and its attachment over *FPIS* shall be in accordance with one of the following:
  - a) the cladding manufacturer's installation instructions for installation over *FPIS*; or
  - b) where vinyl siding manufacturer's installation instruction for vinyl siding certified and labeled as conforming to ASTM D3679 does not address application over *FPIS*, the vinyl siding manufacturer's installation instructions for vinyl siding installed over structural sheathing capable of independently resisting negative design wind pressures shall be permitted when the following conditions are met:
    - i) the wind pressure rating of the vinyl siding is reduced to account for the wind load acting on the vinyl siding layer and fasteners securing the vinyl siding and foam sheathing,
    - ii) a minimum safety factor of 2 is used in determination of the reduced wind pressure rating, and
    - iii) cladding fastener length is adequate to maintain required penetration into the framing; or
  - c) engineered design.
6. For applications where furring is installed over *FPIS*, furring shall be attached to wall framing to resist transverse wind load applied to furring from cladding and *FPIS*, and to support cladding weight.

*User Note: Refer to Commentary C1.3 for guidance on installation of cladding and furring over FPIS on light frame wood or steel walls. This standard and typical practice relies primarily on cladding or furring attachments to provide securement for permanent wind load resistance of exterior wall covering assemblies which include FPIS products as a component.*

*Designing FPIS attachments for the full design wind load has some advantages such as improved temporary wind resistance during construction and less reliance on quality of siding installation for wind resistance of the FPIS component and wall covering assembly as a whole.*

## **6.0 Wind Pressure Resistance Requirements**

**6.1 General.** Tests shall be conducted in accordance with Test Method A.2 or A.3 (see Annex A) and Table 2.

**TABLE 2: Product Orientation on Test Frame to Address Intended  
End-Use Installation Conditions<sup>1,2,3</sup>**

<b>FPIS Face Orientation on Test Frame</b>	<b>FPIS Length Axis Relative to Wall Framing (Studs)</b>			
	<i>Unblocked</i>		<i>Blocked</i>	
	Parallel	Perpendicular	Parallel	Perpendicular
Three tests with each face of <i>FPIS</i> oriented toward suction chamber for each <i>FPIS</i> length axis orientation option(s) at right. Regardless of face orientation, <i>FPIS</i> is always to be located on opposite side of test frame from suction chamber per Test Method A.2.  <b>Exception:</b> <i>FPIS</i> with foam core materials that are homogenous through thickness and, if <i>facers</i> are included, have identical <i>facers</i> on both sides of <i>FPIS</i> , shall not be required to test in both orientations with respect to test chamber.	The test result for this condition shall be permitted to be used for the following conditions: (1) <i>Unblocked</i> parallel, (2) <i>Blocked</i> parallel, (3) Perpendicular ( <i>blocked</i> ) and Perpendicular ( <i>unblocked</i> ) provided the <i>FPIS</i> has bending properties in length direction that are at least equivalent to the width direction.	The test result for this condition shall be permitted to be used for the following conditions: (1) Perpendicular ( <i>unblocked</i> ), (2) Perpendicular ( <i>blocked</i> ), (3) Parallel ( <i>blocked</i> ) and Parallel ( <i>unblocked</i> ) provided the <i>FPIS</i> has bending properties in width direction that are at least equivalent to the length direction.	The test result for this condition shall be permitted to be used for the following conditions: (1) Parallel ( <i>blocked</i> ) and (2) Perpendicular ( <i>blocked</i> ) provided the <i>FPIS</i> has bending properties in length direction that are at least equivalent to the width direction.	The test result for this condition shall be permitted to be used for the following conditions: (1) Perpendicular ( <i>blocked</i> ) and (2) Parallel ( <i>blocked</i> ) provided the <i>FPIS</i> has bending properties in width direction that are at least equivalent to the length direction.

**TABLE NOTES:**

1. Parallel and perpendicular (*unblocked*) conditions correspond to conditions where the horizontal edges are not continuously supported and vertical edges are continuously supported. Parallel and perpendicular (*blocked*) conditions correspond to conditions where all edges are continuously supported.
2. Each stud spacing condition intended for end-use shall be tested or alternatively the allowable wind pressure resistance value established from testing the maximum stud spacing intended for end-use shall be permitted to be used for smaller stud spacing.
3. The minimum number of stud bays spanned continuously by a single *FPIS* in the required wind pressure qualification test *specimens* shall be consistent with the manufacturer's installation instructions. For example, if installation instructions do not restrict the size of *FPIS* (or minimum number of stud bays that must be spanned), then qualification testing shall be conducted with at least one stud bay in the test *specimen* spanned by an individual *FPIS* cut to match the center-to-center width of the stud bays.

*User Note: Wind pressure resistance values obtained from this testing apply only to the FPIS product's ability to resist bending load from wind pressure with orientation and blocking specified in Table 2 and with other support conditions specified in Test Methods A.2 or A.3, as applicable. Other components such as siding and framing or connections may limit the allowable design wind pressure resistance of the exterior wall or exterior wall covering assembly.*

**6.2 Nominal Wind Pressure Resistance ( $P_{nom}$ ).** A product's nominal wind pressure resistance value for each condition tested in accordance with Table 2 shall be taken as the lowest value of the maximum test pressures recorded from the required test repetitions.

**6.3 Yield Wind Pressure Resistance ( $P_y$ ).** A product's yield wind pressure resistance value for each condition tested in accordance with Table 2 shall be taken as the smallest yield test pressure from the required test repetitions. The value of  $P_y$  shall be determined in accordance with the following criteria:

1. Determine initial slope of load-deflection plot by determining the slope of a line defined by points on the load deflection plot at 10% and 30% of the nominal load.
2. Offset the above line such that the X-axis intercept equals the deflection recorded at 10% of nominal load.
3.  $P_y$  is the pressure associated with the point where the offset line intersects the load-deflection plot.

**6.4 Pressure Equalization Factor (PEF).** A PEF of 1.0 shall be required for *exterior wall sheathing* applications.

**Exceptions:**

1. For conditions where the design negative wind pressure load determined in accordance with Section 4.0 does not exceed 30 psf, a PEF of 0.9 shall be permitted to determine negative wind pressure resistance only for *exterior wall sheathing* on wall assemblies having an interior finish of at least 0.5-inch-thick gypsum wall board (ASTM C1396) or any material of at least equivalent bending strength, rigidity and air permeability.

**6.5 Allowable Design Wind Pressure Resistance ( $P_{all}$ ).** For each nominal wind pressure resistance value determined in accordance with Section 6.2 addressing end-use installation conditions in accordance with Section 6.1 and each PEF factor condition addressed in accordance with Section 6.4, a design wind pressure resistance value shall be determined in accordance with the following equation:

$$P_{all} = P_{nom} / [(SF)(PEF)] \leq P_y \quad [\text{Eq. 1}]$$

where:

$P_{all}$  = allowable design wind pressure resistance for the *FPIS* product and appropriate wall assembly condition corresponding with the PEF factor and nominal wind pressure resistance value

$P_{nom}$  = nominal wind pressure resistance value determined in accordance with Section 6.2

$P_y$  = pressure at which yielding behavior is considered to initiate due to a relatively rapid decrease in *FPIS* product stiffness during uniform pressure testing (see Section 6.3)

*User Note: An approved agency shall determine  $P_y$  based on test results using Test Method A.2; refer to commentary Section C6.3 for additional guidance.*

SF (safety factor) = 1.5

PEF = pressure equalization factor determined in accordance with Section 6.4

**Exception:**  $P_{nom}$  shall not be required to be limited to  $P_y$  provided that  $P_{nom}$  is taken as the least maximum test pressure from tests in accordance with Test Method A.3 (see Annex A).

## 6.6 Conditions of Use

6.6.1 The allowable design wind pressure for the *FPIS* product determined in accordance with Section 6.5 shall meet or exceed the positive and negative design wind pressure determined in accordance with Section 4.0.

**Exception:** *FPIS* is permitted to be selected using positive pressure only when the *FPIS* product is restrained from outward movement by cladding which is installed directly in contact with the surface of the *FPIS* product, is capable of resisting the full design wind load without reduction for pressure equalization, and has bending stiffness under uniform pressure loading that is greater than that of the *FPIS* product.

6.6.2 For applications where the foam sheathing is attached to the wall with fasteners capable of resisting the design negative wind pressure load independent from and without reliance on the cladding material and its attachment, the *approved agency* and manufacturer shall incorporate qualification testing and quality assurance procedures for fastener head or washer pull-through resistance of the *FPIS* product.

*User Note: ASTM E330 and ASTM E1233 are examples of suitable methods to evaluate capacity and determine design values for FPIS connections in accordance with Section 6.6.2. While qualification testing in accordance with specific requirements of Test Method A.2 and A.3 are intended to evaluate bending failure of foam sheathing under fully supported conditions (bearing on test frame members), modification of these methods is the recommended approach for evaluation of failure modes associated with fastener head or washer pull-through resistance of the FPIS product. For quality assurance purposes, individual fastener head or washer pull-through tests may be conducted in accordance with an appropriate test method, such as ASTM D1037, Section 15 coupled with periodic follow-up testing in accordance with modified Test Method A.2 or A.3 as applicable.*

## 7.0 Quality Assurance and Product Labeling

**7.1 Quality Control.** *FPIS* products complying with this standard shall be produced under a quality assurance program administered by an *approved agency*. An approved quality assurance manual shall be developed in collaboration with the *approved agency*. The quality assurance manual shall specify quality assurance testing and process control requirements in accordance with Sections 7.2 and 7.3.

### 7.2 Quality Assurance Testing

7.2.1 Test equipment shall be properly maintained, calibrated, and evaluated for precision, accuracy and adequacy at a frequency satisfactory to the *approved agency* and consistent with the applicable standards.

7.2.2 The frequency of tests as required by Section 7.1 shall be chosen to yield quality assurance performance that supports design capacities assigned to the product.

### 7.3 Process Control

7.3.1 Data from tests outlined in 7.1 shall be evaluated prior to shipment of the material represented by the *sample*. Analytical procedures shall determine if product capacities are in statistical control. The control levels selected shall support current design capacities.

7.3.2 When the analysis described in 7.3.1 indicates that the product is below the control level, the associated portion of production shall be subject to re-examination in accordance with the acceptance procedures provided in the approved quality assurance manual.

7.3.3 All pertinent records shall be maintained and be available for review by both in-house and *approved agency* personnel. At a minimum, such records shall include:

7.3.3.1 All inspection reports and records of test equipment calibration, whether accomplished by in-house or by *approved agency* personnel.

7.3.3.2 All test data, including retests and data associated with rejected production.

7.3.3.3 Details of any corrective actions taken and the disposition of any rejected production resulting from tests or inspection.

#### **7.4 Specific Requirements for *FPIS* Products**

7.4.1 Reference values for quality and process control purposes shall be established using Test Method A.1 (Annex A) and *FPIS* material sampled from the same lot of material used for qualification testing in accordance with Section 6.2. In addition, the correlation between reference values per 7.4.1 and qualification testing in accordance with Section 6.2 shall be monitored for quality and process control purposes.

7.4.2 For applications where the intent of the manufacturer's installation instructions for the *FPIS* product and its attachment is to resist the design wind load independent of the cladding material and its fastening, quality assurance for *FPIS* attachment to resist wind load shall be provided in accordance with Section 6.6.2.

7.4.3 In addition to quality control testing based on correlated reference values, the quality assurance program shall include periodic follow-up testing in accordance with Test Method A.2 (Annex A).

#### **7.5 Labeling**

7.5.1 *FPIS* products shall be labeled with the name and identification of an *approved agency* responsible for verifying conformance to the requirements of this standard.

7.5.2 Product shall be labeled to indicate conformity with this standard and a notation referencing manufacturer's literature for finding wind pressure rating, pressure equalization factor and attachment method for wind pressure resistance.

7.5.3 Product label shall also include a coding to trace the product back to manufacturing plant and date of manufacture.

7.5.4 An example of a label meeting the requirement of Section 7.5.2: "Complies with ANSI/FS 100; refer to manufacturer for wind pressure rating."

## ANNEX A – Test Methods

(Mandatory ANNEX)

### A.1 Bending Strength Behavior and Quality Control Test Method (“Test Method A.1”)

A.1.1 Bending tests shall be conducted in accordance with Section 10.5 of ASTM C203 using Method 1 (refer to Sections 1.1.1, 4.1.1 and 5.2 of ASTM C203) and Procedure D (refer to Sections 1.2.4 and 4.3.4 of ASTM C203) with the following modifications:

*SPECIMEN ORIENTATION:* *Specimens* shall be cut from *FPIS samples* with test *specimen* span dimension oriented in the cross-machine or width direction of the board. *Specimen* shall be placed in test apparatus such that the crosshead applies downward force and deflection to the exterior side (if applicable) of the *FPIS*.

*SPECIMEN SIZE:* The test *specimen* shall be full thickness with facings (if any) intact. In lieu of the range of permissible test specimen dimensions in Section 8 of ASTM C203, the test *specimen* span-to-thickness ratio (L/d) shall be 10 (except 16 shall be used for ½" thick *specimens*) and the *specimen* shall be not more than 2 inches greater in length than the required span. *Specimen* width-to-thickness ratio (b/d) shall be at least 4.

*SPECIMEN CONDITIONING:* In lieu of conditioning requirements of ASTM C203 Section 9, *specimens* shall be equilibrated to and tested with an ambient air temperature of 75°F +/- 4°F.

*DEFLECTION:* In lieu of deflection requirements in ASTM C203 Sections 4.2 and 10.1 or 10.2 and the crosshead speed requirement in Section 10.5.2 of ASTM C203, the *specimen* shall be deflected at a constant crosshead rate of 0.625 inches/min up to a maximum mid-span deflection of 1.6 inches or to a mid-span deflection at which the applied load drops by 50% from the peak applied load, with or without the occurrence of rupture. Deflection shall not be limited by 5% strain in accordance with ASTM C203 Sections 4.2 (Note 1) and Sections 10.1.6 and 10.2.6 of ASTM C203 shall not apply. Deflection measurement shall be based on cross-head movement without accounting for *specimen* compression at support and loading points as discussed in Sections 10.1.5 and 10.2.5 of ASTM C203.

*REFERENCE VALUE:* The reference value for the *sample* shall be the calculated value from Equation (6) of ASTM C203 Section 11.1 using the lowest value of maximum cross-head force (load) recorded for all required test *specimens* for the bending stress direction associated with each qualification test value.

A.1.2 Test method modifications shall be permissible provided an at least equivalent correlation to wind pressure qualification tests (Section A.2) is achieved subject to the review and approval of the *Approved Agency*.

A.1.2.1 The span dimension of the *specimen* shall be indicated as corresponding with the length or width direction of the *FPIS* as appropriate for the intended use of the test results. The side of the product or *facer* subjected to tension due to bending load application shall be as appropriate for the intended use of the test data.

## A.2 Wind Pressure Qualification Test Method (“Test Method A.2”)

A.2.1 Wind pressure resistance tests shall be conducted in accordance with ASTM E 330 and Sections A.2.2 through A.2.4. Alternatively, uniform pressure tests conducted in accordance with the test method described in Section 7.2 of DOC/PS 2-10 shall be permitted, except deflection measurements shall be read at mid-span of the sheathing at mid-height of the wall in the two outer stud bays and averaged for construction of a load-deflection plot for each *specimen*.

*User Note: If the DOC/PS 2-10 test method is used, horizontal sheathing joints are unblocked and thus the qualification test results are applicable to installation conditions where horizontal sheathing joints are not supported on framing or blocking.*

A.2.2 Construct a minimum 4-ft x 8-ft (1.2 m x 2.4 m) test frame in accordance with ASTM E330 with stud framing members fully supported. The *FPIS* product shall be of the desired thickness for testing and shall be placed on the side of the test frame opposite the suction pressure chamber. Assembly conditions (framing spacing, product orientation on framing and test frame size) shall be representative of the intended conditions of use including presence of *FPIS* joints, single span and multiple span conditions as applicable per manufacturers’ installation instructions. Width of bearing on studs at *FPIS* edges shall not be greater than  $\frac{3}{4}$  inches. Faces of the *FPIS* shall be oriented relative to the test apparatus suction chamber such that results correspond with positive or negative wind pressure loading directions for products that have non-identical *facer* material on opposite faces of the *FPIS* and which are labeled to identify which *facer* material faces outward from the wall. Separate testing is required to address *FPIS* installation parallel or perpendicular to studs, unless the weaker condition is used for the purpose of wind pressure qualification.

*User Note: Testing in accordance with specific requirements of A.2.2 is intended to evaluate bending failure of foam sheathing where foam sheathing bears on stud framing. Where it is intended to evaluate the *FPIS* product and its attachment for wind pressure resistance independent of cladding and cladding fasteners, the *FPIS* product shall be placed on the side of the frame facing the suction chamber. Support of studs shall be provided in a manner to limit stud deflection without restraining movement of the *FPIS* product or reducing load resisted by the attachment of the *FPIS* product to the frame. Assembly conditions (framing spacing and product orientation on framing) shall be representative of the intended conditions of use including presence of panel joints, single span and multiple span conditions as applicable per manufacturers’ installation instructions.*

A.2.3 A uniform suction pressure load shall be applied in accordance with ASTM E330, Method B, except deflection measurements shall be read at mid-span of the sheathing at mid-height of the wall in the two outer stud bays and averaged for construction of a load-deflection plot for each *specimen*. The maximum test pressure shall be recorded for each *specimen*.

A.2.4 Studs of the test frame shall be fully supported in accordance with A.2.2 to prevent failure of framing members or frame connections prior to bending failure of foam sheathing. Frame supports shall not interfere with response of foam sheathing to the applied uniform pressure load.

A.2.5 *FPIS* test *specimens* shall be equilibrated to and tested in an ambient temperature condition of 75°F +/- 4°F.



### A.3 Wind Pressure Qualification Test Method (“Test Method A.3”)

A.3.1 Wind pressure resistance tests for determining structural performance under cyclic air pressure differential shall be conducted in accordance with requirements of ASTM E1233 and the requirements of this Annex.

A.3.2 The test frame shall be permitted to be in accordance with Section A.2.2 except 1x2 battens shall be applied to the outside face of the *FPIS* product at each stud location on the test frame. Battens shall be fastened to studs to provide a 1.5 inch bearing width for withdrawal restraint under negative pressure loading cycles. Any modifications to allow cyclic air pressure testing shall be reported. *FPIS* test specimens shall be conditioned in accordance with A.2.5.

*User Note: Testing in accordance with specific requirements of A.3.2 is intended to evaluate bending failure of foam sheathing where bearing of foam is on stud framing and battens. Where it is intended to evaluate the FPIS product and its attachment for wind pressure resistance independent of cladding and cladding fasteners, the FPIS product shall be fastened to the frame in accordance with the intended end use application in lieu of use of battens. Support of studs shall be provided in a manner to limit stud deflection without restraining movement of the FPIS product or reducing load resisted by the attachment of the FPIS product to the frame. Assembly conditions (framing spacing and product orientation on framing) shall be representative of the intended conditions of use including presence of panel joints, single span and multiple span conditions as applicable per manufacturers’ installation instructions.*

A.3.3 The general loading sequence shall be in accordance with Section X1.2.1 or X1.2.2 of ASTM E1233. Prior to application of the maximum test load, the observed condition of test specimens including visible damage and permanent set in sheathing deformation shall be recorded.

A.3.4 The maximum test pressure in accordance with ASTM E1233 shall be reported. For purposes of establishing the nominal wind pressure resistance value per Section 6.2.4, the maximum test pressure shall not exceed 1.5 times values of  $P_{pos}$  and  $P_{neg}$  as applicable.