



AMERICAN FOREST & PAPER ASSOCIATION
American Wood Council
Engineered and Traditional Wood Products

May 14, 2009

David Pereg, P.E.
Staff Engineer
ICC Evaluation Service, Inc.

Re: Proposed Revisions to the Acceptance Criteria for Vinyl Siding, Subject AC37-0609-R1 (DP/MB)

Dear David:

Below are suggestions regarding Subject AC37-0609-R1.

a) 3.2.5.3.4 Conditions of Acceptance: The maximum point in time average of the five pressure differential readings across the siding shall be divided by the maximum overall pressure reading across the test wall for a given test to determine the PEF for the product.....

Reason: Editorial. Clarify that the "maximum average" pertains to the maximum point in time average of the pressure readings over the duration of the test.

b) 3.3.3.1 Minimum nominal ~~by~~ 1/2' -inch-thick (12.7 mm) extruded polystyrene...

3.3.3.2 Minimum nominal ~~by~~ 1/2' -inch-thick (12.7 mm), foil-faced, extruded polyisocyanurate...

Reason: Editorial.

c) 3.3.4.2.2 Negative wind resistance tests shall be conducted in accordance with ASTM D 5206, except the required plastic film shall be located between the foam plastic sheathing and the wall framing (not between the vinyl siding and the foam plastic sheathing) and the foam plastic sheathing shall not be perforated with 2-inch diameter (51 mm) holes. The test assemblies shall be constructed in a manner consistent with the construction methods and materials that are to be recognized in the evaluation report. A minimum of three identical assemblies shall be tested in accordance with ASTM D5206 Section 9.5 (Procedure B) ~~and the lowest tested failure pressure value (not the average for all specimens) shall be used as the failure pressure for the assembly.~~

The allowable negative wind pressure for the wall covering assembly (foam plastic sheathing plus siding) shall be taken as the lesser of the following:

1) design pressure determined in accordance with Annex A1 of ASTM D 3679, using the lowest tested failure pressure (not the average for all specimens) and a pressure equalization factor (PEF) acting across the wall covering assembly assumed to be 1.0

2) design pressure determined in accordance with Annex A1 of ASTM D3679, using a safety factor of 2.0 (not 1.5 per Annex A1) and a pressure equalization factor (PEF) acting across the wall covering assembly assumed to be 1.0.

As an alternative to assuming PEF equal to 1.0, the PEF shall be determined as follows: ~~or assumed to be as follows:~~

4a. A PEF of 0.7 shall be used for wall covering assemblies consisting of unbacked vinyl siding and foam plastic sheathing complying with Section 3.3.3, when application is limited to use on wall assemblies having a minimum 1/2' -inch thick (12.7 mm) gypsum wallboard on the inside face. ~~2-~~A PEF of 1.0 shall be used when ~~wall covering assemblies as described in Item 1, above, are used on wall assemblies without a the~~ minimum 1/2' -inch-thick (12.7 mm) gypsum wallboard is not on the inside face.

b. Individual report applicants may apply a different value for the PEF, provided testing in accordance with Section 3.2.5.3 (on a test wall constructed in a manner consistent with the recognition being sought) is submitted to ICC-ES. The PEF shall not be less than 0.6.

Reason: Resistance to negative wind pressure is being provided by a combination of siding and sheathing. While the 1.5 safety factor (per Annex A1) for vinyl siding wind resistance is applied to the lowest of three tests instead of the average, it is not adequate to address the potential for very low variability in the test data nor the consequence of failure of the combined vinyl siding and foam sheathing system. A minimum factor of safety of 2.0 is proposed on the average of the three tests in addition to use of the 1.5 factor on the lowest value to ensure minimum safety levels that are more comparable to other sheathing options. As a point of comparison for suitability of the 2.0 factor, the average factor of safety on nail withdrawal from wood (such as may be caused by wind suction loading) is 3.125 which is greater than the minimum factor of 2.0 proposed.

d) 3.3.4.2.3.1 Testing Approach: The allowable positive wind pressure resistance of the foam plastic sheathing alone shall be determined in accordance with ASTM E 330 using three, 4-foot by 8-foot (1219 by 2438 mm) full-scale wall assembly specimens. The test assembly shall be constructed in a manner consistent with the construction methods and materials that are to be recognized in the evaluation report. A vertical joint in the foam plastic sheathing shall be located over the center of one of the intermediate studs. The ~~minimum~~ tested positive pressure resistance at foam plastic sheathing failure (rupture) or loss of bearing at sheathing edges shall be taken as the ~~ultimate tested failure~~ ~~positive~~ ~~pressure~~ ~~resistance~~.

The allowable positive wind pressure for the wall covering assembly (foam plastic sheathing plus siding) shall be taken as the lesser of the following:

1) design pressure determined from the lowest tested failure pressure (not the average for all specimens) ~~The ultimate positive pressure resistance shall be~~ divided by a safety factor of 1.5 and the ~~pressure equalization factor (PEF) to determine the allowable positive wind pressure resistance of the foam plastic sheathing and, thus, the wall covering assembly. The~~ PEF acting across the wall covering assembly ~~shall be taken as assumed to be~~ 1.0; ~~or as the following:~~

2) design pressure determined from the average tested failure pressure divided by a safety factor of 2.0 and a pressure equalization factor (PEF) acting across the wall covering assembly assumed to be 1.0.

As an alternative to assuming PEF equal to 1.0, the PEF shall be determined as follows:

4a. A PEF of 0.7 shall be used for wall covering assemblies consisting of unbacked vinyl siding and foam plastic sheathing complying with Section 3.3.3, when application is limited to use on wall assemblies having a minimum 1/2' -inch thick (12.7 mm) gypsum wallboard on the inside face. ~~2-~~A PEF of 1.0 shall be used when ~~wall covering assemblies as described in Item 1 above are used on wall assemblies without a~~the minimum 1/2 - inch-thick (12.7 mm) gypsum wallboard ~~is not~~ on the inside face.

b. ~~As an alternate, t~~he PEF may be determined by testing as described in Section 3.2.5.3, except the exterior of the test wall shall be constructed in a manner consistent with the construction methods and materials that are to be recognized in the evaluation report. A vertical joint in the foam plastic sheathing shall be located over the center of one of the intermediate studs. The test chamber shall be set up to apply a positive load to the exterior side of the test wall. The PEF shall be determined in accordance with Section 3.2.5.3.4, except the PEF shall be the maximum pressure differential measured across the foam plastic sheathing divided by the maximum overall pressure reading across the test wall for a given test. If any of the three PEF results for each test pressure level varies by more than 15 percent from the average of the results for the three tests at that pressure level, the highest PEF shall be used. The PEF for the foam plastic sheathing shall be the average of the low, medium and highest pressure PEF values, or 0.60, whichever is higher.

Reason: Same as that provided for negative wind pressure.

Thank you for the opportunity to comment.

Sincerely,
Philip Line, P.E.
Senior Manager, Engineering Research



May 18, 2009

Mr. David Pereg, P E.
ICC-ES
5360 Workman Mill Road
Whittier, CA 90601

Re: Acceptance Criteria for Vinyl Siding; Subject AC37-0609-R1

Dear Dave:

I have some comments on this draft AC for your consideration

- 1) In Section 3.3.4.2.2, the wind load resistance of the vinyl siding is required to be tested in accordance with ASTM D 5206 with 2 important exceptions specifically permitted in this section: a) the plastic film shall be located between the foam plastic sheathing and the wall framing, but not between the vinyl siding and the foam plastic and b) the foam plastic sheathing shall not be perforated with 2-inch diameter holes. These exceptions to ASTM D5206 purposely deviate from the intent of the testing, which is to "permit full pressure load transfer to the siding test specimen" (quoted from Section 8.3.1 of ASTM D5206). If the vinyl siding is tested this way for the wind rating with foam plastic sheathing that is not capable of independently resisting the full negative design pressure, the evaluation report must include a limitation of use by requiring the vinyl siding be installed without any perforation through the foam plastic sheathing in any exterior walls. Perhaps a new section of "Evaluation Report Recognition," just like the other AC's, shall be added to the end of this AC to include such a specific limitation for products recognized through this AC.
- 2) In the same section, since the vinyl siding is designed to resist the wind load, the safety factor used to derive the wind rating must not follow Annex A1 of ASTM D 3679. Instead, the factor of safety must be increased from 1.5 to 2.0 to reflect the fact that the vinyl siding is serving as the structural sheathing to protect the building envelop. Therefore, I suggest the second paragraph in Section 3.3.4.2.2 be revised as follows:

The allowable negative wind pressure for the wall covering assembly (foam plastic sheathing plus siding) shall be determined in accordance with Annex A1 of ASTM D 3679, using a safety factor of 2.0, and a pressure equalization factor (PEF) acting across the wall covering assembly assumed to be 1.0; or assumed to be as follows ... (no changes to the remaining section)

- 3) In Section 3.3.4.2.3.1, since the vinyl siding is designed to resist the wind load, the safety factor used to derive the wind rating must be increased from 1.5 to 2.0 to reflect the fact that the vinyl siding is serving as the structural sheathing to protect

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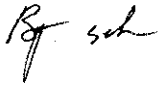
Page 2 of 2
May 18, 2009

the building envelop. Therefore, I suggest the 5th sentence in this section be revised as follows:

The ultimate positive pressure resistance shall be divided by a safety factor of ~~1.52.0~~ and the pressure equalization factor (PEF) to determine the allowable positive wind pressure resistance of the foam plastic sheathing and (no changes to the remaining section).

Thanks for your consideration.

Sincerely,



Borjen ("B J.") Yeh, Ph D , P E.
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May 18, 2009

David Pereg, P.E.
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5360 Workman Mill Road
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RE: Proposed Revisions to Acceptance Criteria for Vinyl Siding, Subject AC 37-0609-R1

Dear Mr. Pereg:

Thank you for the opportunity to comment on the proposed revisions to AC 37. Our staff has reviewed the criteria and we have some concerns relative to the proposed methodology.

It appears the criteria allows ½-inch interior gypsum wallboard to carry some portion of the out-of-plane wind load when un-backed vinyl siding is installed over foam plastic sheathing. The proposal states that the information presented is based on a testing program.

- Should the quality of the gypsum board used in the testing program be benchmarked and a requirement added to the criteria that these capacities be maintained?
- Should minimum durability requirements for the wallboard be added, equivalent to other structural frame components, now that it is performing this critical function?
- Should the evaluation reports for systems that rely upon interior drywall contain explicit limitations within the evaluation report concerning gypsum board installation? For example, it would seem necessary to require minimum fastening schedules and a requirement for finishing (taped and mudded) similar to the condition used in the testing program.
- Are penetrations allowed in the wallboard for plumbing and electrical? Was this addressed in the testing program?
- Is this system appropriate for all portions of the building such as gable ends?

The criteria allows prescriptive installations per the IRC. The minimum allowable wind pressure resistances required to qualify for the prescriptive provisions of 2009 IBC Section R703.11.2 should be explicitly stated in the AC. (i.e. The system must have a minimum allowable positive/negative pressure resistance of XX psf to be recognized for compliance with the prescriptive provisions of Section R703.11.2.1 and 703.11.2.2.) Without this, there is no guarantee that the siding meets the minimum benchmark level of performance assumed by these new IRC sections.

Thank you for consideration of these comments. If you have any questions regarding these comments please don't hesitate to contact me at 208-429-3715 or at Daniel.Cheney2@Weyerhaeuser.com

Sincerely,

Daniel W. Cheney (sent via e-mail)

Daniel W. Cheney, P.E.
Director of Codes and Product Acceptance

Comments on Proposed Revisions to Acceptance Criteria for Vinyl Siding Subject AC37-0609-R1

Submitted by the Vinyl Siding Institute
David S. Johnston, Sr. Technical Director
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19 May 2009

1.4.3 Allowable Pressures definition

As presented, this is not actually a definition, but rather an instruction on how to determine a particular parameter used in an Evaluation Report. We agree that a definition of Allowable Pressures is needed and offer an alternative below. In addition, the procedure for determining the Allowable Pressure needs to be more clearly stated.

As presented, the instruction for determining Allowable Pressure cannot be implemented. In D3679 Annex A1, the design pressure, D_p is determined for a given wind velocity using equations derived from ASCE 7. A pressure equalization factor (PEF) is not an element of these calculations, and thus the instructions in the proposed definition cannot be carried out. However, also in Annex A1, an equation is used to determine a test pressure, P_t from the previously calculated design pressure and from a pressure equalization factor. It would be possible to reverse this equation, and solve for D_p based on a known test pressure and PEF. If that is what is intended by this definition, then it needs to be reworded to state that. We offer our alternative to both the definition and the procedure below:

1.4.3 Allowable pressure(s): The maximum wind pressure which the siding or assembly has been shown to withstand under applicable test methods. The siding or assembly is intended to be used only in locations and applications where the design pressure is less than or equal to the allowable pressure for the siding or assembly. The allowable pressure is equivalent to the design pressure, D_p , that is derived from testing under test methods such as ASTM D5206. To determine the allowable pressure, solve for D_p using the equation found in section A1.2.2 in Annex A1 of ASTM D3679, using the maximum test pressure, P_t , determined from testing and the pressure equalization factor (PEF) applicable to the product.

3.1.2 Vinyl Siding, Exception

The exception is necessary in order to allow recognition under previous editions of the code, without requiring compliance with later editions of referenced standards. However, it is not necessary to describe the subject matter of each difference between current and older editions of the standards. We would suggest the following revision:

EXCEPTION: For recognition under the 2006 IBC and/or the 2006 IRC, data to show compliance with ~~the lead content requirements of~~ Section 4.6 of the ASTM D3679-06a is not required.

Section 3.2.5.3.4 (First part)

This change appears to be inconsistent with previous application of the test method and would lead to inconsistent, inaccurate results, and an artificially lenient pressure equalization factor.

The procedure for an individual test is initiated by opening the valves between the Vacuum Chamber and the Exterior Chamber. This induces a pulse of rapidly decreasing pressure (relative to atmospheric pressure) in the Exterior Chamber, representing a gust of wind. The pressure of the air between the siding and the sheathing follows this decrease in Exterior Chamber pressure to the extent that air is able to pass quickly through the siding to the Exterior Chamber. Because the air cannot instantly cross the siding, the pressure behind the siding will always lag behind the pressure in the Exterior Chamber. There will be some point during the course of the pressure pulse where the difference between the pressure in the Exterior Chamber and the pressure behind the siding will be at its greatest.

This maximum pressure difference, and the point in time at which it occurs, are the reference points for determining the pressure equalization factor for that individual test. The maximum difference in pressure is determined by continuously measuring the pressure at five points behind the siding, averaging the five pressure readings at each point in time, and comparing this average to the pressure in the Exterior Chamber at the same point in time. The point in time at which the maximum pressure differential occurs is noted, as well as the magnitude of the differential. *At that same point in time* the pressure difference between the Exterior Chamber and the Interior Chamber is noted. This may *or may not* be at the peak of the negative pressure pulse inside the Exterior Chamber, and it may *or may not* be the greatest pressure differential between the Exterior Chamber and the Indoor Chamber that occurs during the test.

Once the maximum differential across the siding, and the corresponding differential across the entire wall, are known, the differential across the siding is divided by the differential across the wall to give the pressure equalization factor for that individual test.

The proposed change appears to ask that the maximum pressure difference across the wall that occurs *at any time during the pulse* be used to determine the PEF for a given test. This is incorrect, because the maximum pressure across the wall bears no relationship to the maximum pressure across the siding *if it occurs at a different time*. The maximum pressure difference across the wall could be very different from that at the point in time where the pressure across the siding is at its greatest. A PEF calculated from two independent and unrelated pressure differences would not properly reflect the ability of the siding to equalize pressures and withstand windload stresses. Furthermore, the resulting PEF is likely to be artificially low (permissive), and would not represent the full extent of wind pressures exerted on the siding.

Given this, we urge that the change to the first part of paragraph 3.2.5.3.4 not be made. (The change to the second part of that paragraph is still needed and we support that.) The *first instance* of the word “maximum” does no harm, and can be accepted. However, the *second instance* of the word “maximum” would cause the incorrect calculation described

above; this word should not be added. The words “for a given test” also do no harm and can be included if desired.

Foam Sheathing Coalition Proposed Changes, Section 3.3

While VSI is not opposed the concepts in this proposal, the proposed coverage was developed independently from the vinyl siding industry. After becoming aware of it shortly before the proposal deadline, we attempted to work with the Foam Sheathing Coalition to address numerous concerns raised by the original draft. While some of those concerns have been addressed in the proposed revision that is now out for public comment, there remain fundamental problems with the proposed approach. There are also a number of errors and inconsistencies in the proposed coverage. Accordingly, we do not believe that the proposed revision is appropriate or suitable for inclusion in AC37. Without ruling out the possibility that suitable coverage could be developed in the future, we urge that the changes proposed for Section 3.3, and related changes throughout the document, not be adopted.

Our concerns are summarized below.

- The need for the proposed changes has not been clearly established. Prescriptive requirements for allowable pressure of vinyl siding/foam sheathing assemblies have already been established in the IRC. The proposal simply references them, which is unnecessary. It is not clear why the same prescriptive requirements could not also be proposed for the IBC itself, eliminating the need for the expensive testing that would be the only option under Section 3.3.4.2. The vinyl siding industry is doubtful that the limited application of vinyl siding over foam sheathing in high wind zones justifies the specified testing.
- The effects of the various product specifications and limitations, test methodologies, and rating criteria have not been fully explored and validated. This is likely to result in unintended consequences, which would bear most heavily on the vinyl siding industry. Until there has been an opportunity to fully examine the ramifications of the proposed changes, they should not be included in the document governing the evaluation of vinyl siding.
- The proposal hinges on implementation of certain laboratory test methods, which are partially and awkwardly described in the proposal. An Acceptance Criteria is not the proper place for the establishment of technical test methods. Instead, the methodologies envisioned by the proponent should be submitted to a professional standards making organization such as ASTM, where a standard test method can be fully developed through a consensus process involving people with the appropriate expertise. Such a standard could then be referenced by AC37.
- The proposal concerns the performance of an assembly composed of at least two distinct products, only one of which is vinyl siding covered by AC37. The proposed revision would put the burden of compliance – both initial and ongoing – on the manufacturer of vinyl siding, as the report holder. Yet the performance or availability of the other major component of the assembly, the foam sheathing, is beyond the control of the vinyl siding manufacturer. The Evaluation Report of the siding manufacturer, and all company approvals and certifications, publications and

specifications that depend on the Evaluation Report, would be vulnerable to technical changes, quality control issues, withdrawal from the market, or other inconsistencies on the part of the sheathing.

- The proposal applies only to unbacked siding, and neglects coverage for another popular form of vinyl siding, foam-backed siding. If the proposed coverage has value, it should be available to all forms of vinyl siding. There is no apparent technical reason why the same methods and criteria could not be used to determine allowable pressures for foam-backed siding over foam sheathing.

As noted above, there are a number of errors and inconsistencies in the proposed coverage*. If further consideration is given to the proposed coverage, those errors also need to be addressed.

VSI is not opposed to the development of methods for windload rating of vinyl siding used over foam sheathing, and the inclusion of such ratings in Evaluation Reports. However, such coverage needs to be developed with the active involvement of the affected industry, and result in provisions that can be used practically and efficiently by the report holder to demonstrate compliance with the code. We believe that the current proposal cannot be made suitable in the time frame of the current revision cycle. We would be open to further development of the proposed test method and rating criteria in the context of a standards process such as ASTM and would work with the Foam Sheathing Coalition to that end. Once that is successfully completed, we may be able to revisit the proposed coverage in AC37 and produce appropriate, jointly-supported provisions using the standardized test methodology as a reference.

*Summary of specific issues:

- Sec. 3.3.1: typos.
- Secs. 3.3.3.1 and 3.3.3.2: typos.
- Sec 3.3.3.4: Unclear why sheathing would not have to comply with thermal insulation requirements of AC12. Foam plastic sheathing normally has to comply with AC12, and its normal application is as insulating sheathing; that is what a user or code official would expect. Why would the sheathing not be expected to provide insulating value, and how would this lack of demonstrated insulating value be communicated to the user and the code official?
- Sec. 3.3.4.1: It is entirely possible that the assembly of foam sheathing and vinyl siding could demonstrate higher windload resistance than the siding alone over conventional sheathing, especially if a different fastening method is used. This paragraph should not peremptorily exclude a higher rating even with conventional fastening, and should more explicitly allow for superior fastening to result in a superior allowable pressure.
- Sec. 3.3.4.2. The second PEF alternative is redundant. The main paragraph has already stated that the PEF must be 1.0 unless an exception applies; the sole possible exception is item 1.

- Sec. 3.3.4.2: It is not clear why the PEF resulting from testing cannot be lower than 0.6; no explanation is given.
- Sec. 3.3.4.2.3.1: The ultimate positive pressure resistance should not be determined from the test pressure *at failure* but rather the highest pressure that the sample was able to *successfully* withstand.
- Sec. 3.3.4.2.3.1: As in sec. 3.3.4.2, the second PEF alternative is redundant; 1.0 has already been established as the default.
- Sec. 3.3.4.2.3.1, PEF test method: As detailed in our objection to the change in section 3.2.5.3.4 above, it is not appropriate to compare the maximum pressure across the sample with the maximum pressure across the entire wall assembly *at different times*. The equalization factor reflects the response of the sample under dynamic conditions, which must be measured and compared at the same time during the pressure pulse. The proposed approach would result in an artificially favorable PEF.
- Sec. 3.3.4.3, last paragraph: There are no conditions that do not fit into either IRC R703.11.2.1 or R703.11.2.2. Those paragraphs are designed to cover *all* possible applications. Paragraph R703.11.2.2 explicitly applies to *all* conditions that do not fall under the previous paragraph. Therefore, the testing described in the paragraph is never *required*, it is only provided as an option to develop an alternative to the prescriptive requirements of the two IRC paragraphs. The indication that such testing is *required* contradicts the intent stated in section 3.3.1 of this proposal.