ICC EVALUATION SERVICE

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September 1, 2009

TO: **PARTIES INTERESTED IN EVALUATION REPORTS ON STRUCTURAL INSULATED PANELS (SIP) AND THEIR USE AS SHEAR WALLS IN SEISMIC DESIGN CATEGORIES D, E, AND F**

SUBJECT: Proposed Revisions to the Acceptance Criteria for Sandwich Panels, Subject AC04-1009-R1 (PB/RK)

Hearing Information:
Tuesday, October 6, 2009
8:00 a.m.
Sheraton Gateway Hotel Los Angeles
6101 West Century Boulevard
Los Angeles, California 90045
(888) 627-7104

Dear Madam or Sir:

ICC-ES has received a request to revise Section 4.5.1 of the subject acceptance criteria as shown in the attached document. The proposal was prepared by a group of current report holders who have petitioned the ICC-ES staff to revise the scope of their evaluation reports to permit the use of their structural insulated panels (SIPs) as components of a building's seismic-force-resisting system in Seismic Design Categories D, E, and F, where SIP structural sandwich panels consist of a foam-plastic core material factory-laminated (adhered) between wood structural-use sheathing (facing) materials.

Currently, Section 4.5.1 of AC04 (the Acceptance Criteria for Sandwich Panels) restricts the use of SIPs, used as shear walls, for buildings assigned to Seismic Design Categories (SDCs) A, B, and C. There are three reasons for this restriction:

1. The primary reason has been that typical sandwich panel, especially SIP, wall installations conflict with the provisions of Section 2305.3.10 of the 2006 *International Building Code* (IBC), which states that "adhesive attachment of shear wall sheathing…shall not be used in combination with mechanical fasteners in Seismic Design Categories D, E, or F." Typical installation instructions for SIPs call for a continuous bead of sealant placed between each wood-based structural sheathing (facing) of the SIP wall panel and adjacent wood framing members (top and bottom plates and wood splines), which is the same location where mechanical fasteners are installed at specified schedules to achieve shear wall strength and stiffness, as shown in Figures R613.5(3), R613.5(4), and R613.8 of the 2009 *International Residential Code* (IRC). Although the sealants are used to

reduce air infiltration, most recommended sealants also have a substantial adhesive quality such that the sealants are stressed in combination with the mechanical fasteners when SIP shear walls are resisting lateral earthquake loading, and negatively impact the performance of SIP shear walls in the inelastic region of data collected during cyclic-load testing. Please note: ICC-ES is not making a blanket statement that all elastomeric sealants (adhesives) commonly used with SIP shear wall assemblies always cause unacceptable performance of SIP shear walls when subjected to cyclic-load testing; rather, we are requiring compliance with the prescriptive requirement that wood-based structural-use panels (facings) of SIP shear walls be mechanically fastened directly to framing members without sealants/adhesives when used in SDCs D, E, and F. Consequently, the restriction shown in Section 4.5.1 of AC04 is consistent with the restriction set forth in Section 2305.3.10 of the IBC.

2. Another reason that Section 4.5.1 of AC04 restricts the use of SIP shear walls to SDCs A, B, and C, is the lack of vertical, load-carrying, framing members (i.e., studs) within SIP wall assemblies. In a conventional wood-framed, wood-panel, load-bearing shear wall, conforming to Section 2305.3 (Design of Wood Shear Walls) and Section 2308.9 (Wall Framing) of the 2006 IBC, the wood studs support gravity loads and are typically intact after lateral (seismic) loading of the shear wall. In contrast, a SIP shear wall assembly consists of a layer (inner core) of rigid foam plastic insulation that is laminated on both sides with one layer of wood-based structural-use sheathing (facer), typically oriented strand board (OSB). Only at vertical joints of adjacent SIP panels, different types of splines (surface splines, insulated panel splines or block splines, and structural splines) are located to ensure wall continuity. By design, the OSB skins of SIP shear wall assemblies support all gravity loads; however, lateral seismic forces can at the same time induce considerable in-plane shear stresses in the OSB sheathing (facings) of the SIP walls, which may already be highly stressed in compression when used as bearing walls. Consequently, this combined load condition causes a transformation of internal stresses within the OSB sheathing (facers) where the normal and shearing stresses reach their maximum intensity at unknown locations and may exceed allowable limits. Therefore, the restriction shown in Section 4.5.1 of AC04 is consistent with ICC-ES having incomplete information concerning compound stresses in the OSB facings that result from a load combination that includes gravity and earthquake loads acting simultaneously on the load-bearing SIP shear wall.

3. A third reason for Section 4.5.1 of AC04 restricting the use of SIP shear walls to SDCs A, B, and C, is the need for a procedure to ascertain equivalency of cyclic-load test data associated with SIP shear walls to cyclic-load test data associated with conventional wood-framed, wood-panel, load-bearing shear walls, conforming to Section 2305.3 (Design of Wood Shear Walls) and Section 2308.9 (Wall Framing) of the 2006 IBC. Without a recognized procedure to compare test data, ICC-ES has been unable to recognize the use of the seismic parameters assigned in item A.13 in Table 12.2-1 of ASCE 7-05 for a seismic-force-resisting system consisting primarily of SIP shear wall assemblies in SDCs D, E, and F. Therefore, the restriction shown in Section 4.5.1 of AC04 is consistent with ICC-ES having

incomplete information concerning the correlation between proprietary SIP shear wall assemblies and the seismic-force-resisting systems described in Table 12.2-1 of ASCE 7-05.

A group of manufacturers with current evaluation reports requested AC04 be revised to include an exception to Section 4.5 of AC04, to permit the use of SIP shear walls in all IBC Seismic Design Categories. Their requested revisions are noted in the enclosed document entitled, "Proposed Changes to Acceptance Criteria for Sandwich Panels – AC04". Staff has not revised the enclosed document editorially or technically. The purpose of this letter and the enclosed document is to solicit comments from interested parties which may aid in creating a finalized draft that can be considered by the Evaluation Committee.

The enclosed document attempts to address the three reasons, stated previously, that Section 4.5.1 of AC04 restricts the use of SIPs to SDCs A, B, and C, and provides either prescriptive or performance requirements, or both, such that SIP shear walls may be considered for use in SDCs D, E, and F. The document deals with the three issues as follows:

- The enclosed document prescriptively restricts the use of sealants to locations within the SIP shear wall assembly such that compliance with the intent of Section 2305.3.10 of the IBC is met. (See the last sentence of Section A.1.3.5.)

- The enclosed document categorizes SIP shear walls as either non-load-bearing wall assemblies (see Section A.2.1) or as load-bearing wall assemblies (see Section A.2.2). Each of these categories has prescriptive assemblies that are factory-fabricated with framing members having the same size, height, and spacing as conventional wall construction as specified in Section 2308.9 of the IBC; see Section A.2.1.1 (Assembly A—non-load-bearing) and Section A.2.2.1 (Assembly D—load-bearing). The reason that both a non-load-bearing (Assembly A) and a load-bearing (Assembly D) SIP shear wall assembly is manufactured in this manner is to permit them to be deemed equivalent to code-compliant shear wall assemblies; see Section A.3.1. The two other non-load-bearing assemblies (Sections A.2.1.2 and A.2.1.3) and the one other load-bearing assembly (Section A.2.2.2) have prescriptive construction requirements as well as performance requirements as described in Section A3.0—Panel Load Tests.

- The enclosed document contains guidelines for the purposed of expanding the scope of ICC-ES evaluation reports and recognizing SIP shear walls as the primary seismic-force-resisting system for buildings located in areas designated SDC D, E, or F. The bases for the guidelines are AC322 *(Acceptance Criteria for Prefabricated, Cold-formed, Steel Lateral-force-resisting Vertical Assemblies)* and AC130 *(Acceptance Criteria for Prefabricated Wood Shear Panels),* which specify seismic performance attributes that are used to establish compatibility between proprietary shear-resisting elements and wood-framed wood-panel shear walls defined by the IBC when used within the building's seismic-force-

resisting system. Sections in the enclosed document that deal specifically with such issues are:

- Section A.3.3.2: The seismic performance parameter in this section is an indicator of ductility. It sets a lower bound on the ratio of the displacement at post peak failure (defined as the value where the load drops off by 20% from the peak load) to the displacement at the assigned ASD design load. The minimum value of 11 for this ratio ensures a reasonable amount of yielding prior to reaching the peak load value without bringing up the controversial issue of selecting a "yield point" from nonlinear test data. Since having additional ductility is beneficial, an upper limit is not specified.

- Section A.3.3.3: The seismic performance parameter in this section is intended to ensure that the SIP shear walls have a drift capacity that is compatible with the code-defined system consisting of light-framed load-bearing wood walls with wood-based structural-use sheathing. It sets a lower bound of 2.8% of the panel height on the displacement at post-peak failure, which is defined as the value where the load drops off by 20% from the peak load. Since having additional drift capacity is beneficial, an upper limit is not specified.

- Section A.3.3.4: The seismic performance parameter is this section is an indicator of overstrength. It sets a lower and upper bound on the ratio of peak strength to ASD design strength to ensure that the overstrength of the panels are compatible with other components of the code-defined seismic-force resisting system. A lower bound ensures a minimum margin of safety, and an upper bound ensures that components of the seismic-force resisting system (i.e., anchorage and drag struts) can be designed using traditional procedures specified in the code. The last paragraph of Section A.3.3.4 requires manufacturers of SIP wall panels to specify the actual overstrength inherent in their SIP panels as well as special design and detailing requirements as part of the evaluation report when necessary.

Overall, staff supports the intent of the enclosed document, which is to establish prescriptive and performance requirements for SIP shear walls for use in buildings as the primary seismic-force-resisting systems in buildings located in areas designated as Seismic Design Categories D, E, and F.

The contents of the proposal along with the current AC04 (http://www.icc-es.org/criteria/pdf_files/ac04.pdf) need substantial editorial revisions so that the two can be merged. For example, Section 1.5.1 of AC04 needs to include reference to ASTM E 2126, since it is mentioned in the proposed Appendix A. Additionally, the numbering of sections and subsections within the proposed Appendix A. Additionally, the numbering of sections and subsections within the proposed Appendix A needs a thorough rewrite to ensure uniformity through (e.g., currently there are two main sections with the same identifier A.3.3). These two examples concern editorial issues; however, there are other revisions that become technical in nature, because revising the language of many sections runs the risk of changing the intent.

At a minimum, the proposal needs to be revised to address the following technical concerns:

1. The definition of “sealant” shown in Section A.1.3.4 should be revised to reference material specifications or consensus standards. Also, the definition needs to delete all reference to placement of sealants at the interface between SIP facing material and boundary members, which is the location of fasteners for shear wall applications. The definitions should focus on material specifications and the purpose of using sealants within SIP shear wall assemblies, and should avoid any specific end-use installation details.

2. A definition of “fasteners” needs to be included within Section A.1.3 (Definitions) such that, at a minimum, the physical properties and material requirements for fasteners comply with IBC Section 2303.6, when the fasteners are used to construct SIP shear walls intended to be compliant with the proposed appendix. Additionally, the size, type, and spacing of SIP fasteners in boundary members (splines, top plate, bottom plate, and sill plate) need to be compliant with IBC Table 2306.4.1 As currently worded, the definition for “SIP Shear Wall Assembly” (Section A.1.3.6 of the proposed Appendix A) permits fasteners to be any type recommended by the SIP manufacturer as specified in their ICC-ES evaluation report. SIP wall panels are sometimes installed with types of fasteners not specified in Table 2306.4.1, such as cooler nails. Finally, there is a reason for referencing this table (IBC Table 2306.4.1) with respect to size, type, and spacing of fasteners for the SIP shear wall assemblies covered by the scope of the proposed Appendix A: The SIP shear wall assemblies described in later sections of the appendix are to be evaluated against specific seismic performance criteria that have been established to provide a level of performance deemed necessary if SIP shear walls are to be considered consistent in seismic performance to wood shear walls used in the seismic-force-resisting system described item A.13 of Table 12.2-1 of ASCE 7-05.

3. The definition of “SIP Shear Wall Assembly” (Section A.1.3.6 of the proposed Appendix A) needs to be revised such that SIP shear wall panels have vertical boundary details (i.e., vertical wood members at shear wall boundaries and adjoining panel edges) according to IBC Section 2306.4.1 (specifically footnote h to Table 2306.4.1); bottom/sill plates and anchorage according to IBC Section 2305.3.11; and tie-down details for overturning restraint according to IBC Section 2305.3.7. Also, the definition of the SIP shear wall assemblies needs to provide details on derivation of top-of-wall deflection (drift) of the SIP shear wall assemblies according to IBC Section 2305.3.1. The reason for this information is the same as noted in comment 2.

4. The panel test load protocol and analysis of data for SIP shear wall assemblies identified as “Assembly B” (see Section A.2.1.2), “Assembly C” (see Section A.2.1.3), and “Assembly E” (see Section A.2.2.2), need to be revised to be consistent with the concept of “equivalency” that is proposed to rationalize the required performance of the SIP shear wall assemblies assigned the same seismic

coefficients as the system defined by code (item A.13, Table 12.2-1, ASCE 7-05). Specifically, Section A.3.0.2 needs to be revised as follows: “SIP shear wall assemblies B and C described in Section A.2.2 shall be evaluated in accordance with Section A.3.2 for lateral loads and Section A.3.3 for establishing seismic equivalency to code-compliant wood shear walls for recognition in all SDC’s.” Section A.3.0.3 needs to be revised similarly to reference Section A.3.3 for establishing seismic equivalency, and the reference section for axial loads needs to be revised to Section A.3.4

You are cordially invited to submit written comments on agenda items, or to attend the Evaluation Committee hearing and present verbal comments. If you wish to contribute to the hearing, please note the following:

1. Written comments that are received by the Los Angeles business/regional office by **September 18, 2009,** will be forwarded to the committee prior to the hearing, and will be posted on the ICC-ES web site shortly after the comment deadline.

2. Written comments received up to ten days before the meeting, and staff memos responding to comments, will be posted to the web site on **September 29, 2009**.

3. ICC-ES is no longer providing printed copies at the meeting of proposed acceptance criteria, staff memos or public comments. These documents will be available on a limited number of CDs at the meeting, for uploading to computers; and ICC-ES will make arrangements with the hotel business center to have hard copies available for photocopying.

4. Written comments that miss the deadline noted in item (1), above, will only be available at the meeting if you provide 35 copies, collated, stapled, and three-hole punched, either at the meeting itself or to the Los Angeles business/regional office by **September 29, 2009**.

5. If you plan to speak for more than 15 minutes, or offer a visual presentation lasting longer, you should notify ICC-ES staff as far as possible in advance. There will be a computer, projector, and screen available at the meeting for anyone wishing to make a visual presentation, and presentations in most cases will need to be in PowerPoint format. Also, ICC-ES will need to be provided with your presentation at least a half-hour before the start of the relevant meeting session (morning or afternoon) on either a CD or a flash card.

6. If you have any special needs related to a presentation, you should contact ICC-ES staff well in advance of the meeting.

7. Any visual aids for viewing at committee meetings (charts, overhead transparencies, slides, videos, electronic presentations, etc.) will be permitted only if a copy is provided to ICC-ES, before the presentation, in a medium that can be retained with other records of the meeting.

8. Any materials submitted for committee consideration are considered nonconfidential and available for public discussion, as noted in Section 2.7 of the ICC-ES Rules of Procedure for the Evaluation Committee.

9. Prior to the meeting, you should refrain from trying to communicate directly with committee members about agenda items, either verbally or in writing. Committee members reserve the right to refuse such communications.

Your cooperation with these guidelines is much appreciated, as is your interest in the deliberations of the Evaluation Committee. If you have any questions, please contact the undersigned at (800) 423-6587, extension 3721, or Russ Krivchuk, Senior Staff Engineer, at extension 3275. You may also reach us by e-mail at es@icc-es.org.

Yours very truly,

Peter Bahlo, P.E.
Senior Staff Engineer

PB/jw

Enclosures

cc: Evaluation Committee

4.5 Wall Panel Racking Shear Tests:

4.5.1 Racking shear tests in accordance with ASTM E72, as amended by this criteria, are required for shear walls that resist wind and seismic loads under the IBC, IRC, BNBC, SBC, and UBC. Evaluation reports including the use of sandwich panels as shear walls under the IBC and IRC shall include a statement that the panels are recognized for use in Seismic Design Categories A, B and C.

> **Exception:** When sandwich panels are evaluated in accordance with the requirements set forth in Appendix A, shear walls of sandwich panels are permitted to be used in all IBC Seismic Design Categories. Evaluation reports shall include a statement that the panels are recognized for use in all Seismic Design Categories.

APPENDIX A

OPTIONAL CYCLIC-LOAD TEST REQUIREMENTS

FOR SIP SANDWICH PANELS

A.1.0 INTRODUCTION

A.1.1 Purpose: The purpose of this appendix is to provide procedures for recognition of structural insulated panels (SIPs) as shear walls in Seismic Design Categories D, E, and F in ICC-ES, Inc., evaluation reports. These reports consider the panels as alternatives to those described in the 2006 *International Building Code*® (IBC). The reason for this appendix is the absence of referenced standards in the IBC that can be used to establish code compliance for SIPs. The basis of this appendix is IBC Section 104.11.

A.1.2 Scope:

A.1.2.1 This appendix is limited to SIPs as defined in Section A.1.3.5. Other types of sandwich panels are beyond the scope of Appendix A. Extrapolation of test results to other SIP assemblies is not permitted. Interpolation of test results is permitted if the mechanical fastening schedule is the only variable that is under consideration.

A.1.2.2 The scope of this appendix is limited to the wall assemblies described in section A.2 of this appendix.

A.1.3 Definitions: The definitions in this appendix may be unique and are intended to apply to this appendix only.

A.1.3.1 Adhesive: In addition to meeting requirements of Section 2.4 of AC04, adhesives shall be limited to laminating the foam core to the oriented strand board (OSB) or plywood structural facers.

A.1.3.2 Backbone Curve: The locus of extremities of the load-displacement hysteresis loops. It represents the peak loads from the first cycle of each phase of the cyclic loading.

A.1.3.4 Sealant: A sealant that is used at the interface between SIP and the wall perimeter members as well as the SIP-to-SIP interfaces. The sealant is typically used to minimize air movement through completed structure. The specification for the sealant used in the SIP shear wall assembly per Section A.1.3.6 shall be documented.

A.1.3.5 Structural Insulated Panels (SIPs): SIPs are factory-laminated sandwich panels consisting of solid-core insulation adhesively attached to structural skins of wood-based structural-use panels, complying with PS2, such as oriented strand board (OSB) or plywood. Plywood may comply with either PS1 or PS2.

The structural wood-based skins shall be attached with mechanical fasteners to wood members at the perimeter of the SIP shear wall. Splines used to connect the vertical edges of SIP panels (SIP-to-SIP interconnection) may be wood, or wood based. Mechanical fasteners shall be used to attach the SIPs structural skins to the splines.

A.1.3.6 SIP Shear wall Assembly: A SIP shear wall assembly is a wall assembly consisting of two or more structural insulated panels assembled using the report applicant's end use recommendations. The end use recommendations include, but are not limited to, fastener size and type, fastener schedule, method for SIP-to-SIP interconnection, wall boundary details, tie down details for overturning restraint, and application of sealants. No application of sealants shall occur between the oriented strand board or plywood facings and wood, or wood based framing members.

A.1.3.7 **Spline, Block** – A pair of wood structural panels of the same material as the structural insulated panel facings bonded with the same foam core to form a block with overall thickness equal to the core thickness of the two structural insulated panels to be connected.

A1.3.8 **Spline, Surface** – A strip of wood structural panel of the same material as the structural insulated panel facings that fits into a groove cut into the longitudinal edges of the two structural insulated panels to be joined

A.2.0 DESCRIPTION OF SIP SHEAR WALL TYPES

A.2.1 Non Load Bearing SIP Shear wall Assemblies:

A.2.1.1 SIP Shear wall Assembly A consists of a SIP as defined in section A.1.3.5 with 2x lumber used as top plates, bottom plates and vertical studs at 16 or 24 inches on center. The splines used to attach the SIPs are the vertical 2x lumber.

A.2.1.2 SIP Shear wall Assembly B consists of a SIP as defined in section A.1.3.5 with 2x lumber used as top plates, bottom plates and double 2x vertical studs at 48 inches on center. The splines used to attach the SIPs are the vertical double 2x lumber.

A.2.1.3 SIP Shear wall Assembly C consists of a SIP as defined in section A.1.3.5 with 2x lumber used as top plates, bottom plates and a vertical block or surface spline at 48 inches on center. The splines used to attach the SIPs are block or surface splines.

A.2.2 Load Bearing SIP Shear wall Assemblies:

A.2.2.1 SIP Shear wall Assembly D consists of a SIP as defined in section A.1.3.5 with 2x lumber used as top plates, bottom plates and vertical studs at a 16 or 24 inches on center. The splines used to attach the SIPs are the vertical 2x lumber.

A.2.2.2 SIP Shear wall Assembly E consists of a SIP as defined in section A.1.3.5 with 2x lumber used as top plates, bottom plates and double 2x vertical studs at 48 inches on center. The splines used to attach the SIPs are the vertical double 2x lumber.

A3.0 PANEL LOAD TESTS

A3.0.1 SIP shear wall assembly A and D described in section A.2.2 is code equivalent to the IBC and no testing is necessary for recognition in all SDC's.

A3.0.2 SIP shear wall assembly B and C described in section A.2.2 shall be evaluated in accordance with A3.2 for lateral loads for recognition in all SDC's.

A3.0.3 SIP shear wall assembly E described in section A.2.2. shall be evaluated in accordance with A3.2 for lateral loads and A3.3 for axial loads for recognition in all SDC's.

A3.1 Seismic Design Compatibility Testing Protocol

A3.1.1 Refer to ASTM E 2126 for the test protocol to be used with this appendix. SIP panel shall be tested with skins bearing on the top and bottom plates when required by typical end-use applications.

A3.2 Panel Analysis - 2006 IBC Allowable Loads:

A3.2.1 Allowable Stress Design: The Allowable Stress Design (ASD) load for the test sample shall be the lesser of the allowable loads based on a drift limit or strength limit, determined as follows:

A3.2.1.1 Drift Limit (Seismic): The ASD load which satisfies the drift limit requirements of Section 12.8.6 of ASCE 7 as referenced in IBC Section 1613.1 shall be computed as follows:

(a) Maximum inelastic response displacement, δ_x, shall be defined as either the inelastic drift limit defined in Section 12.12.1 and Table 12.12-1 of ASCE 7, or the mean displacement at the Strength Limit State of the tested wall assemblies, Δ_{SLS}, whichever is smaller.

(b) Using δ_x determined above and the assigned C_d factor(see Section 5.2.1), the Strength Design (LRFD) level response displacement, δ_{xe}, shall be calculated based on formula (12.8-15) of ASCE 7, assuming an importance factor, I, equal to 1.0. For other importance factors, δ_{xe} shall be adjusted accordingly.

(c) From the first-cycle backbone curve of the cyclic-load testing, the force corresponding to δ_{xe} shall be determined. This corresponds to a Strength-level factored resistance.

(d) The strength-level factored resistance shall be converted to an ASD level resistance by multiplying it by 0.7 for use with the load combinations of Section 1605.3 of the IBC.

(e) The drift corresponding to the ASD resistance load derived in item (d) shall be derived from the first-cycle backbone curve and included in the evaluation report.

A3.2.1.2 Strength Limit (Seismic): The ASD load based on the strength of the SIP shear wall assemblies shall be derived by dividing the ultimate test loads, as determined by Section A3.1 of this acceptance criteria, by a factor of safety of 2.5 for seismic forces responding to this allowable load capacity shall be derived from the first-cycle backbone curve.

A3.3 Lateral Load Seismic Design Compatibility with a Code-defined Seismic-force Resisting System:

A3.3.1 SIP panels may be used as components within a seismic-force resisting system, and be assigned the following response modification coefficient, R, system overstrength factor, Ω_0, and deflection amplification factor, C_d, provided compliance with the evaluation parameters specified in Sections A3.2.2, A3.2.3, and A3.2.4 is established:

IBC:

Response Modification Coefficient: $R = 6\ ½$

System Overstrength Factor: $\Omega_0 = 3$

Deflection Amplification Factor: $C_d = 4$

A3.3.1.1 The evaluation parameters specified in Sections A3.3.2, A3.3.3, and A3.3.4 are based on data derived from testing using the CUREE protocol, but may be used for comparison with walls tested using either the SEAOSC (SPD) or CUREE test method. Test results from SPD and CUREE shall not be mixed for purposes of determining compliance to evaluation parameters specified in Sections A3.3.2, A3.3.3 and A3.3.4.

A3.3.1.2 The evaluation procedure set forth in Section A3.3 is intended for determining equivalency of a specific set of seismic-design coefficients and factors (R, Ω_0, and C_d) only; it is not intended to negate the provisions for ASD load value derivation in other sections of this criteria.

A3.3.2 The lower bound on the ratio of the displacement at the post-peak load to the displacement at the assigned ASD design load:

$$\frac{\Delta U}{\Delta ASD} \geq 11$$

where:

Δ_{ASD} = The displacement at the ASD design load developed in Section A3.2of this criteria, as applicable.

Δ_U = The ultimate displacement taken from the backbone curve corresponding to an absolute load having no more than 20 percent strength degradation of the post peak load data point (See Sections 3.2.6 and 3.2.12 of ASTM E 2126).

A3.3.3 The minimum post-peak displacement shall be in accordance with the following:

$$\Delta_U \geq 0.028H$$

where:

H = The height of the prefabricated wall panel

Δ_U = The displacement taken as a post-peak point on the backbone curve with no more than 20 percent strength degradation (see Section 3.2.12 of ASTM E 2126).

A3.3.4 The ratio of peak strength to the assigned ASD design load shall be in accordance with the following:

$$2.5 \leq \frac{Ppeak}{PASD} \leq 5.0$$

where:

P_{peak} = The peak strength of the SIP shear wall panel.

P_{ASD} = The assigned ASD design load developed as applicable.

The ratio of peak load capacity to ASD design capacity may exceed 5.0 provided the evaluation report includes a requirement that collectors and their connections, bearing and anchorage of the panel, and the lateral load path to the panel are designed in accordance with the special load combinations of Section 12.4.3 of ASCE 7, using E_m, where E_m is calculated using the test panel overstrength.

A3.3 Axial Load Evaluation Criteria

A3.3.1 SIP Shear wall Assembly D axial loading capacity is in accordance with the IBC or engineering mechanics for framed walls.

A3.3.2 SIP Shear wall Assembly E axial loading capacity is in accordance with engineering mechanics for framed walls.

A.4.0 EVALUATION REPORT RECOGNITION

Where compliance with Appendix A has been established, the evaluation report shall include a description of the SIP panels, installation requirements to construct a shear wall similar to the SIP shear walls complying with Appendix A, periodic special inspection requirements in accordance with IBC Section 1707.3, product identification, and the following “Conditions of Use”:

- “Panels described in this evaluation report are permitted to be used as shear walls in buildings located in Seismic Design Categories A through F.”

- Where the SIP panel is used as a shear wall in buildings located in Seismic Design Categories D, E, or F, and is combined with other shear-resisting systems, applied loads shall be proportioned based on relative stiffness.

ICC EVALUATION SERVICE, INC.,
RULES OF PROCEDURE FOR THE EVALUATION COMMITTEE

1.0 PURPOSE

The purpose of the Evaluation Committee is to monitor the work of ICC-ES, in issuing evaluation reports; to evaluate and approve acceptance criteria on which evaluation reports may be based; and to sponsor related changes in the applicable codes.

2.0 MEETINGS

2.1 The Evaluation Committee shall schedule meetings that are open to the public in discharging its duties under Section 1, subject to Section 3.

2.2 All scheduled meetings shall be publicly announced.

2.3 Two-thirds ($^2/_3$) of the voting Evaluation Committee members shall constitute a quorum. A majority vote of members present is required on any action.

2.4 In the absence of the nonvoting chairman-moderator, Evaluation Committee members present shall elect an alternate chairman from the committee for that meeting. The alternate chairman shall be counted as a voting committee member for purposes of maintaining a committee quorum and to cast a tie-breaking vote of the committee.

2.5 Minutes of the meetings shall be kept.

2.6 An electronic audio record of meetings shall be made by ICC-ES; no other audio, video, electronic or stenographic recordings of the meetings will be permitted. Visual aids (including, but not limited to, charts, overhead transparencies, slides, videos, or presentation software) viewed at meetings shall be permitted only if the presenter provides ICC-ES before presentation with a copy of the visual aid in a medium which can be retained by ICC-ES with its record of the meeting and which can also be provided to interested parties requesting a copy. A copy of the ICC-ES recording of the meeting and such visual aids, if any, will be available to interested parties upon written request made to ICC-ES together with a payment as required by ICC-ES to cover costs of preparation and duplication of the copy. These materials will be available beginning five days after the conclusion of the meeting but will no longer be available after one year from the conclusion of the meeting.

2.7 Parties interested in the deliberations of the committee should refrain from communicating, whether in writing or verbally, with committee members regarding agenda items. All written communications and submissions regarding agenda items should be delivered to ICC-ES. All such written communications and submissions shall be considered nonconfidential and available for discussion in open session of an Evaluation Committee meeting, and shall be delivered at least ten days before the scheduled Evaluation Committee meeting if they are to be forwarded to the committee. Materials delivered to ICC-ES at least ten days before the scheduled meeting will be posted on the ICC-ES web site (www.icc-es.org) prior to the meeting. After this time, parties wishing to submit materials for consideration by the Evaluation Committee must deliver a sufficient number of copies as directed by ICC-ES. Consideration of materials not received by ICC-ES at least ten days before the meeting is at the discretion of the Evaluation Committee. Following the meeting, ICC-ES will make all materials considered by the Evaluation Committee available on the web site for a maximum period of one year following the meeting. The committee reserves the right to refuse recognition of communications which do not comply with the provisions of this section.

3.0 CLOSED SESSIONS

Evaluation Committee meetings shall be open except that the chairman may call for a closed session to seek advice of counsel.

4.0 ACCEPTANCE CRITERIA

4.1 Acceptance criteria are established by the committee to provide a basis for issuing ICC-ES evaluation reports on products and systems under codes referenced in Section 2.0 of the Rules of Procedure for Evaluation Reports. They also clarify conditions of acceptance for products and systems specifically regulated by the codes.

Acceptance criteria may involve a product, material, method of construction, or service. Consideration of any acceptance criteria must be in conjunction with a current and valid application for an ICC-ES evaluation report, an existing ICC-ES evaluation report, or as otherwise determined by the Evaluation Committee.

4.2 Procedure:

4.2.1 Proposed acceptance criteria shall be developed by the ICC-ES staff and discussed in open session with the Evaluation Committee during a scheduled meeting, except as permitted in Section 5.0 of these rules.

4.2.2 Proposed acceptance criteria shall be available to interested parties at least 30 days before discussion at the committee meeting.

4.2.3 The committee shall be informed of all pertinent written communications received by ICC-ES.

4.2.4 Attendees at Evaluation Committee meetings shall have the opportunity to speak on acceptance criteria listed on the meeting agenda, to provide information to committee members.

4.3 Approval of acceptance criteria shall be as specified in Section 2.3 of these rules.

4.4 Actions of the Evaluation Committee may be

appealed in accordance with the ICC-ES Rules of Procedure for Appeal of Acceptance Criteria or the ICC-ES Rules of Procedure for Appeals of Evaluation Committee Technical Decisions.

5.0 COMMITTEE BALLOTING FOR ACCEPTANCE CRITERIA

5.1 Acceptance criteria may be issued without a public hearing following a 30-day public comment period and a majority vote for approval by the Evaluation Committee when, in the opinion of ICC-ES staff, one or more of the following conditions have been met:

1. The subject is nonstructural, does not involve life safety, and is addressed in nationally recognized standards or generally accepted industry standards.

2. The subject is a revision to an existing acceptance criteria that requires a formal action by the Evaluation Committee, and public comments raised were resolved by staff with commenters fully informed.

3. Other acceptance criteria and/or the code provide precedence for the revised criteria.

5.2 Negative votes must be based upon one or more of the following, for the ballots to be considered valid and require resolution:

a. *Lack of clarity*: There is insufficient explanation of the scope of the acceptance criteria or insufficient description of the intended use of the product or system; or the acceptance criteria is so unclear as to be unacceptable. (The areas where greater clarity is required must be specifically identified.)

b. *Insufficiency*: The criteria is insufficient for proper evaluation of the product or system. (The provisions of the criteria that are in question must be specifically identified.)

c. *The subject of the acceptance criteria is not within the scope of the applicable codes*: A report issued by ICC-ES is intended to provide a basis for approval under the codes. If the subject of the acceptance criteria is not regulated by the codes, there is no basis for issuing a report, or a criteria. (Specifics must be provided concerning the inapplicability of the code.)

d. *The subject of the acceptance criteria needs to be discussed in a public hearings*. The committee member requests additional input from other committee members, staff or industry.

5.3 An Evaluation Committee member, in voting on an acceptance criteria, may only cast the following ballots:

- Approved
- Approved with Comments
- Negative: Do Not Proceed

6.0 COMMITTEE COMMUNICATION

Direct communication between committee members, and between committee members and an applicant or concerned party, with regard to the processing of a particular acceptance criteria or evaluation report shall take place only in a public hearing of the Evaluation Committee. Accordingly:

6.1 Committee members receiving an electronic ballot should respond only to the sender (staff). Committee members who wish to discuss a particular matter with other committee members, before reaching a decision, should ballot accordingly and bring the matter to the attention of ICC-ES staff, so the issue can be placed on the agenda of a future committee meeting.

6.2 Committee members who are contacted by an applicant or concerned party on a particular matter that will be brought to the committee will refrain from private communication and will encourage the applicant or concerned party to forward their concerns through the ICC-ES staff in writing, and/or make their concerns known by addressing the committee at a public hearing, so that their concerns can receive the attention of all committee members.■

Effective March 18, 2008