



April 28, 2008

TO: PARTIES INTERESTED IN EVALUATION REPORTS ON FOAM PLASTIC INSULATION

SUBJECT: Proposed Revisions to the Acceptance Criteria for Foam Plastic Insulation, Subject AC12-0508-R1 (MB/MO)

Hearing Information:

Wednesday, May 28, 2008

8:00 a.m.

Sheraton Gateway Suites Chicago O'Hare Airport

6501 North Mannheim Road

Rosemont, Illinois 60018

(847) 699-6300

Dear Madam or Sir:

The revisions proposed to the subject acceptance criteria will be considered at the Evaluation Committee hearing noted above. The revisions are prompted by industry comments received at the October 2007 hearing in conjunction with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), and by comments from an evaluation report holder. The following revisions are proposed:

1. Delete requirements, including Table 1, for spray-applied polyurethane foam plastic insulation, which is now covered in AC377.
2. Delete Section 3.3.2, which is now covered in the ICC-ES Acceptance Criteria for Stay-in-place, Foam Plastic Insulating Concrete Form Systems for Solid Concrete Walls (AC353).
3. At the request of The Dow Chemical Company, revise Section 4.5.11.5, Attics and Crawl Spaces, to provide details for conducting diversified tests for deletion of the ignition barrier. The Dow proposal and justification are enclosed with this letter. Staff has included a modified version of their proposal in Section 4.5.11.5. The proposal is a change from the current ICC-ES policy in the following ways:
 - a. For attics, Section 4.5.11.5.1 requires compliance with either the room corner tests of NFPA 286, UL 1715 or UBC Standard 26-3, or with a comparative room corner test using the same three methodologies. The limitations of use are dependent on the method used.
 - b. For crawl spaces, Section 4.5.11.5.2 requires compliance with either the room corner tests of NFPA 286, UL 1715 or UBC Standard 26-3, or with a

comparative crawl space test which is described in Appendix A. The test method is used with permission from Southwest Research Institute and is based on their Test Procedure 05-01. The limitations of use are dependent on the method used.

- c. For attics, if any of the stated test methods is followed, the proposal will allow recognition of exposed foam plastic insulation on attic floors for the same thickness of foam plastic insulation tested on the walls. [The tested assembly does not include foam plastic applied on the floor during the test.]
- d. For attics, comment is requested as to whether the room corner tests can be considered representative of attics with sloped roofs where the wall is less than 8 feet.
- e. For both attics and crawl spaces, the proposal does not include the following limitations of use that have typically been included in evaluation reports when the room corner test method is followed:
 - (1) There are no interconnected attic areas
 - (2) Air in the attic is not circulated to other parts of the building.

Both conditions of use still apply when the comparative test method is followed.

The Dow proposal will require most report holders to retest for attic applications using the room corner methodology. Dow proposes that this requirement become effective one year from the approval of the criteria to allow manufacturers time to conduct the testing. If the proposal is approved by the Evaluation Committee, staff intends to further propose that data must be submitted by the effective date so that evaluation reports can be revised within six months of the effective date; and that evaluation reports that are not revised in accordance with the new criteria within six months following the effective date, be revised on that date to delete recognition of use without an ignition barrier.

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 **May 14, 2008**, 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 **May 23, 2008**.
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 **May 23, 2008**.
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 question, please contact the undersigned at (800) 423-6587, extension 3289, or Michael O'Reardon, at extension 5685. You may also reach us by e-mail at es@icc-es.org.

Yours very truly,



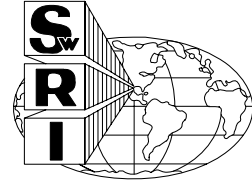
Michael Beaton, P.E.
Senior Regional Manager

MB/MO/lh
Enclosures

cc: Evaluation Committee

APPENDIX A

Test Method for the Evaluation of Foam Plastics on Walls and Ceiling on a Crawl Space Configuration



Based on Southwest Research Institute Test Procedure 05-01

1.0 SCOPE

The objective of this test is to evaluate the relative fire performance foam plastic insulation when tested in a simulated crawl space module to determine if the insulation can be considered for use in crawl space areas without a thermal barrier. The test provides a comparison of fire performance characteristics between a code approved "baseline" assembly and the assembly for which approval is sought.

2.0 TEST CONFIGURATION

A sub-floor assembly shall be mounted on top of a three-sided U-shaped wall module consisting at minimum of nominal 2 x 4-in. lumber and two layers of ½-in. thick gypsum wallboard. The sub-floor shall also be covered with two layers of ½-in. thick gypsum wallboard. The module shall consist of three 8-ft long (outside dimensions) walls, each 4-ft high, with a full open space on one side of the structure.

The floor/ceiling above the crawl space shall be built using nominal 2 x 8-in. x 8-ft floor joists on 16-in. centers, with 2 x 8-in. joist headers, all bearing on 2 x 4-in. sill plates and surfaced with 15/32-in. thick, 4-ply, APA graded A-C Southern Pine plywood sub-flooring with a moisture content between 14% and 18%. Moisture content shall be determined by an electrical resistance moisture measurement.

Note: CDX grade plywood shall not be used. (Variability in quality is too high for the comparison required for this evaluation.)

The joists shall be perpendicular to the camera's line-of-sight, so that they tend to dam the flame front and hold it inside the test area. The floor of the test chamber is covered with approximately 1 in. of sand.

3.0 BASELINE ASSEMBLY

The walls or walls and ceiling shall consist of the foam plastic insulation at the thickness and density specified by client. Wall studs and ceiling joist shall be sized to accommodate the requested thickness. The foam plastic in the walls and ceiling shall be covered with ¼-inch number one yellow kiln dried pine plywood with moisture content between 14% and 18%. Moisture content shall be determined by an electrical resistance moisture measurement.

- 3.1 The time to flames out the front (flames breaking the plane of the front face of the assembly) shall be recorded and used to establish the minimum allowed time for comparison
- 3.2 The time to burn-through the ceiling (flames burning through the ceiling of the assembly at any location) shall be recorded and used to establish the minimum allowed time for comparison

3.3 The testing of the baseline assembly shall be within one week (7days) of the test assembly.

4.0 TEST ASSEMBLY

The walls or walls and ceiling shall consist of the foam plastic insulation at the thickness and density specified by client and equal to the baseline assembly. Wall studs and ceiling joist shall be sized to accommodate the requested thickness and be the same as the baseline assembly. The foam plastic in the walls and ceiling shall be tested exposed or covered/coated in the manner for which is recognition is sought. Density and any other pertinent installation instructions of the foam plastic, any coating and or covering used in testing shall be reported. Applied thickness of the foam plastic, any coating and or covering used in testing shall be measured and reported.

4.1 The time to flames out the front (first flames - intermittent or continuous) breaking the plane of the front face of the assembly shall be recorded. Acceptable performance shall be defined as time longer than the baseline assembly.

4.2 The time to burn-through the ceiling (first flames - intermittent or continuous, burning through the ceiling of the assembly at any location) shall be recorded. Acceptable performance shall be defined as time longer than the baseline assembly.

5.0 IGNITION SOURCE

The fire source is a 22-lb wood crib constructed of nominal 2 x 2-in. lumber (1½-in. square white fir, Douglas fir with a 24 hour conditioned moisture content of 7.5% to 8%. Moisture measured by an electrical resistance moisture measurement), 15-in. square in plane, spaced approximately 1½-in. apart and fastened at right angles with a single nail at each end. The crib is placed in a rear corner of the crawl space 1 in. from each wall surface and supported approximately 4-in. above the floor on small sections of refractory brick. Approximately 150 ml of ethyl alcohol in a metal pan placed under the crib is used for ignition.

6.0 TEST DURATION AND END POINT COMPARISON CRITERIA

The baseline assembly will be burned and the time at which flames start emerging from the front (burn-out the front time) and the time at which there is burn through the ceiling and the location of burn through will be recorded.

The comparative test assembly will be burned and the time at which flames start emerging from the front (burn-out the front time) and the time at which there is burn through the ceiling and the location of burn through will be recorded. The ceiling burn-through test shall be run to failure or five minutes longer than the cut-off time determined from the baseline tests.

The comparative test assembly will be considered to have passed this test if:

- a. The burn (flames) out the front time is longer than the baseline assembly's burn (flames) out the front time (or if the test was terminated at a time five minutes longer than the baseline assembly time); and
- b. The time to burn (flames) through the ceiling is longer than the baseline assembly's burn (flames) through ceiling time (or if the test was terminated at a time five minutes longer than the baseline assembly time).

7.0 DOCUMENTATION

The test report shall include photographs and video documentation positioned to view the entire front of the open side of the module. A timing reference, mechanical or electronic, shall be included in all photographic and video records. The test report shall include photographs, after any needed foam cure time and before the plywood is applied, documenting the thickness of the foam in the baseline assembly (one example is a ruler embedded in the foam showing the thickness). The test report shall include photographs taken the same day and just before the test was run documenting the thickness of the foam in the test assembly (one example is a ruler embedded in the foam showing the thickness). The test report shall include the measured moisture content of all wood used in the testing.

8.0 REPORT

The report shall include:

- Name and location of facility where test is conducted.
- Date of specimen (both baseline and test assembly) construction and date(s) tested.
- A description of the baseline and tested assembly, including:
 - baseline and test assembly construction
 - Description and name of the foam plastic, any coating and/or covering used in testing, included density and measured thickness. If appropriate, application rate and installation procedures shall be reported.
- Photographic and video documentation; pre-test, during (including timing), thickness measurements and post-test.
- The moisture measurements of all wood used in the testing (both baseline and test assembly).
- A summary of visual observations including time to flames exiting the module and/or burn through of the sub-floor assembly.
- Conclusions in the form of a statement of findings summarizing the fire performance of the assembly for which approval is sought compared to the baseline assembly, signed by a representative engineer or officer of the test facility.



200 LARKIN CENTER
March 20, 2008

The Dow Chemical Company
Midland, Michigan 48674

Michael Beaton
ICC Evaluation Services, Inc.
5360 Workman Mill Road
Whitter, CA 90601

PROPOSED CHANGES TO ICC-ES ACCEPTANCE CRITERIA AC-12 AND AC-377

Mr. Beaton,

I am writing to request up-dates to ICC-ES's Acceptance Criteria For Foam Plastic; AC-12 and AC-377. I am proposing changes as outlined in attachment one and attachment two of this letter. As rational for these changes I submit the following:

Fire testing:

There is confusion in the building community and among code officials with respect to what is the appropriate code approved testing when foam plastics are used in a crawl space or attic. AC-12/AC-377 currently only address fire performance in general and does not specifically address fire testing for foam plastics used in a crawl space or an attic. Most of the confusion occurs when foam plastics are used exposed. Multiple avenues have been used by different foam plastic manufactures to show code compliance of their products, when used exposed.

The code and AC-12/AC-377 are both clear that when foam plastics are installed with a thermal barrier in place, use in crawl spaces and attics are compliant and no restrictions are applied.

IRC Section R314.5.3 Attics, IRC Section 314.5.4 Crawl Spaces and the IBC code Section 2603.4.1.6 Attics and crawl spaces all indicate that in an attic or crawl space where entry is made only for service of utilities, and when foam plastics are used, an ignition barrier may be used in place of a thermal barrier to cover the foam plastic. The prescriptive list of code approved ignition barrier includes:

- 1.5-inch-thick (38 mm) mineral fiber insulation,
- 0.25-inch-thick (6.4 mm) wood structural panels,
- 0.375-inch (9.5 mm) particleboard,
- 0.25-inch (6.4 mm) hardboard,
- 0.375-inch (9.5 mm) gypsum board, or
- Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm).

It is clear that when any of these ignition barriers are in use over foam plastics in an attic or crawl space that there are limitations on the use of the area. The phrase "where entry is made only for service of utilities" applies to attics that ONLY contain mechanical equipment, electrical wiring,

fans, plumbing, gas or electric hot water heaters, gas or electric furnaces, etc.. The attic space cannot be used for storage proposes. No fire testing is required for the reduced provisions (from a thermal barrier to an ignition barrier), which provides a barrier whose only purpose is to prevent the direct impingement of flame on the foam plastic insulation.

Many foam plastics are also used exposed with no thermal or ignition barrier. There are multiple avenues to gain approvals for this use:

Room Corner Fire testing:

Currently both the IRC, IBC and AC-12/AC-377 all point to NFPA 286, UL 1715 or UBC-26-3 (using the specific acceptance criteria mentioned) as code approved room corner fire tests to demonstrate acceptable fire performance of exposed foam plastics. The proposed changes to AC-12/AC-377 outlined in attachment one clarifies that when such testing is successfully completed the foam plastic, up to the maximum density and maximum thickness tested can be used exposed in a crawl space or attic with no limitations. It is assumed that the use of these room corner tests are appropriate for assessing the fire performance of exposed foam plastics on the floor, walls, or the underside of crawl space or roof deck. This assumption is valid and has been agreed to and recognized across both the foam plastic industry as well as the fire science community. All other applicable code requirements such as ventilation or use of conditioned spaces in attics and crawl spaces shall be followed.

Comparative Fire testing:

Comparative Room Corner Test:

The proposed changes to AC-12/AC-377 (attachment one, section 5.2.2.2) clarify how comparative room corner fire testing is performed, what the acceptance criteria are and what use limitations results when this method is used to qualify exposed foam plastics. Because the comparison is against the performance of an ignition barrier, the exposed foam carries the max density and max thickness limitation, along with the embedded statement in the code report that the crawl space or attic cannot be used for storage.

Comparative Crawl Space Test:

The proposed changes to AC-12/AC-377 (attachment one, section 6.2.2.2 and attachment two) clarify how comparative crawl space fire testing is performed, what the acceptance criteria are and what use limitations results when this method is used to qualify exposed foam plastics. Because the comparison is against the performance of an ignition barrier, the exposed foam carries the max density and max thickness limitation, along with the embedded statement in the code report that the crawl space cannot be used for storage. Note this test requires the use of a code approved ignition barrier to be run as the baseline comparison (kraft faced fiberglass batts are NOT approved for exposed use in crawl spaces or attics and as such are NOT to be used in comparison fire testing). Also fire science supports the fact that extending this comparative crawl space test to substantiate the performance of exposed foam plastics use in attics is not appropriate. The fire source (a 22lb crib) and the room configuration (4 feet high, 8 feet wide with an open U configuration) does not simulate attics with respect to spread of flame and collection of hot gasses.

Limitations:

Limitations currently applied to foam plastic use in many code reports include:

- There are no interconnected attic areas.
- Air in the attic is not circulated to other parts of the building

- Attic ventilation is provided in accordance with IBC Section 1203.2 or IRC Section R408.1, as applicable.
- [When there are heat producing appliances] Combustion air is provided in accordance with IMC Sections 701 and 703

With respect to NFPA 286, UL 1715 and UBC 26-3. The code and commentary clearly indicates, and I believe many in industry agree, that successfully passing one of these tests allows the use of exposed foam plastic material anywhere in a building (given that all other code requirements are satisfied.) This means that exposed foam can be used in a basement (next to a furnace or hot water heater) or in a bedroom or in a storage room. (Note: the IMC does have language related to the location of HVAC and other appliances with respect to combustibile material. All of the requirements need to be followed, but none of them pertain only to foam (i.e. wood and foam are two examples of combustibile materials). **None of the limitations cited above apply when foam plastic has passed one of the three room corner fire tests.** (The attic ventilation and combustion air requirements are not related to the use of foam plastics, but are other code requirements that are in place whether foam is used or not).

With respect to comparative testing. The limitation that I believe is appropriate for this type of testing is that the exposed foam can only be used in an attic or crawl space (i.e. not basement or habitable space) “where entry is made only for service of utilities” and no storage is allowed.

Air Plenums: The ICC codes do have language and requirements for exposed foam plastic use in an air plenum. By the addition of a separate limitation into AC-12/AC-377 for foam plastics used in air plenums, I was trying to clarify that when doing fire testing that will allow foam to be used exposed that this testing does not negate other foam plastic code requirements. (i.e. IMC requirements). I was adding this language as a clarification; I do not see it as a critical element, as it is clearly a well defined code requirement. If ICC-ES finds this not to be an issue, I have no problem if the language is not included.

General Comments. There is nothing in the foam plastics chapter code language that addresses air flow in or out of the attic (or crawl space). As stated above, attic ventilation, crawl space ventilation and combustion air requirements are not related to the use of foam plastics. There are other code requirements that are in place whether foam is in use or not. If AC-12 and AC-377 include the limitations listed above, they are in effect indicating that no matter what test a foam plastic has passed it can never be used exposed in a conditioned attic unless it has a separate HVAC set-up. That does not make sense and is NOT a code requirement as I understand the code.

I cannot locate any other ICC code justification that supports having the ventilation limitations in AC-12/AC-377. I am not familiar with the history of why they were included in the first place. Lack of knowledge or experience related to the use of foam plastics? What section of the ICC codes does ICC-ES believes applies such that these limitations are needed? The prescriptive code allows the use of many combustibile materials in an attic or crawl space without these limitations. What is the justification for leaving them in? I believe now is the time to clean up multiple issues within AC-12/A377 and deleting these limitations on foam use is a good step forward.

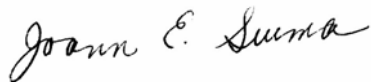
Recommendation:

I propose that the changes to AC-12/AC-377 outlined in attachment one and attachment two go into effect immediately so that those who choose, can take advantage of them. I also propose that

any current report holder (or any who have already filed to convert or obtain a new code report) be able to proceed as they have been for one year. After one year all report holders, and any going through the process, will had to have finished any new testing and their code report would be changed as appropriate (either updated thus keeping certain approvals or edited to delete approvals.) The goal is to make the options available for use, while keeping a level playing field across the industry with respect to any added testing that may need to be done. This may mean that AC-12 and AC-377 list all this testing as an option until the one year deadline arrives - then the testing becomes mandatory (and code report changes at the one year time for those not complying)

I'd be happy to discuss this with you or others at ICC-ES, please feel free to give me a call.

Sincerely,

A handwritten signature in cursive script that reads "Joann E. Surma".

Joann Surma
The Dow Chemical Company
Building Materials Technical Support
Senior Codes and Standards Specialist
200 Larkin Center
Midland, MI 48674
(989) 636-8655

Attachment One

Proposed changes – additions to AC-12 and AC-377:

5 Attics:

5.1 Foam plastics installed in attics where entry is made only for service of utilities are permitted to be protected by an ignition barrier as set forth in IBC Section 2603.4.1.6, IRC Section R314.5.3 or Exception 4 of UBC Section 2602.4. Utilities include, but are not limited to, mechanical equipment, electrical wiring, fans, plumbing, gas or electric hot water heaters, and gas or electric furnaces.

5.2 Thermal or ignition barrier shall not be required when:

5.2.1 The foam plastic insulation shall comply with the applicable provisions of AC12.

5.2.2 Recognition shall be based on one of the following tests:

5.2.2.1 For use on walls or floors of attics or the underside of roof deck (storage allowed): Tests conducted in accordance with NFPA 286 with the conditions of acceptance specified in IBC Section 803.2 or UL 1715 or UBC Standard 26-3, with conditions of acceptance as specified in Section 4.5.2 of AC12. The tests must be conducted with the foam plastic installed, in the manner for which recognition is sought over the gypsum wallboard or glass-reinforced cement board as described in the standard.

5.2.2.2 For use on walls, floors or underside of the roof deck of attics and where entry is made only for service of utilities. The code report shall contain the statement, “no storage is allowed”. Comparative room corner fire tests shall be conducted in accordance with the test procedures of UBC Standard 26-3 or UL 1715 or NFPA 286. The control test assembly shall consist of 1/4 - inch-thick interior CDX grade plywood applied to the interior face of wood wall framing (plywood is permitted by UBC Section 2602.4, Exception 4, IBC section 2603.4.1.6 and IRC section R314.5.3 as a protective material for foam plastic located in attics). The foam plastic insulation shall be applied to the exterior face of the framing, and in turn is covered on the foam plastic's exterior face with 3/8 -inch-thick exterior plywood. The second test assembly is identical, but without plywood on the interior face of the wall. Conditions of acceptance consider the time-to-failure of the control test assembly, as evidenced by flashover, which is flame exiting the door opening. The second assembly with exposed foam plastic shall be tested for at least the same duration of time. A successful comparison is based on no flashover of the second assembly within the time-to-failure of the control test assembly.

5.2.3 Limitations:

5.2.3.1 Recognition in the evaluation report will include the following limitations:

- a. Entry to the attic is only to service utilities (no storage).
- b. If the area is used as a plenum the foam plastic insulation shall meet section XXX of the IRC, section XXX of the IBC and section of the XXX IMC. (fill-in the correct sections)
- c. The foam plastic insulation is limited to maximum thickness and density (and, for EPS, the bead type) tested.

5.2.3.2 Limitation (a) shall be waived provided the foam plastic insulation has successfully passed a room corner fire test conducted in accordance NFPA 286, with conditions of acceptance as set forth in IBC Section 803.2, UL 1715 or UBC Standard 26-3, with conditions of acceptance set forth in Section 4.5.2 of AC 12).

6 Crawl Spaces:

Foam plastics shall be permitted in crawl spaces as follows:

6.1 Foam plastics installed in a crawl space where entry is made only for service of utilities are permitted to be protected by an ignition barrier as set forth in IBC Section 2603.4.1.6, IRC Section R314.5.4 or Exception 4 of UBC Section 2602.4. Utilities include, but are not limited to, mechanical equipment, electrical wiring, fans, plumbing, gas or electric hot water heaters, and gas or electric furnaces.

6.2 Thermal or ignition barrier shall not be required when:

6.2.1 The foam plastic insulation shall comply with the applicable provisions of AC12.

6.2.2 Recognition shall be based on one of the following tests:

6.2.2.1 For use on walls of crawl spaces or the underside of floors in a crawl space (storage allowed): Tests conducted in accordance with NFPA 286 with the conditions of acceptance specified in IBC Section 803.2 or UL 1715 or UBC Standard 26-3, with conditions of acceptance as specified in Section 4.5.2 of AC12. The tests must be conducted with the foam plastic installed, in the manner for which recognition is sought over the gypsum wallboard or glass-reinforced cement board as described in the standard.

6.2.2.2 For use on walls of crawl spaces or the underside of floors in a crawl space and where entry is made only for service of utilities. The code report shall contain the statement, "no storage is allowed". Comparative crawl space fire tests shall be conducted where the performance of the foam plastic insulation is compared under identical test conditions to that of foam plastics covered with a code approved ignition barrier (see IRC section R 314.5.4 for the prescriptive list of ignition barriers). The time to flash over and the time to burn through the wood-framed floor/ceiling must be equal or greater for the foam plastic verses the foam plastic covered with the code approved ignition barrier.

6.2.3 Limitations:

6.2.3.1 Recognition in the evaluation report will include the following limitations:

- a. Entry to the crawl space is only to service utilities (no storage)
- b – If the area is used as a plenum the foam plastic insulation shall meet section XXX of the IRC, section XXX of the IBC and section of the XXX IMC (fill-in the correct sections).
- c. The foam plastic insulation is limited to maximum thickness and density (and, for EPS, the bead type) tested.

6.2.3.2 Limitation (a) shall be waived provided the foam plastic insulation has successfully passed a room corner fire test conducted in accordance NFPA 286, with conditions of acceptance as set forth in IBC Section 803.2, UL 1715 or UBC Standard 26-3, with conditions of acceptance set forth in Section 4.5.2 of AC 12).

Attachment Two

(Patterned after Southwest Research Institute Test Procedure 05-01)

Test Method for the Evaluation of Foam Plastics on Walls and Ceiling on a Crawl Space Configuration

1.0 SCOPE

The objective of this test is to evaluate the relative fire performance foam plastic insulation when tested in a simulated crawl space module to determine if the insulation can be considered for use in crawl space areas without a thermal barrier. The test provides a comparison of fire performance characteristics between a code approved "baseline" assembly and the assembly for which approval is sought.

2.0 TEST CONFIGURATION

A sub-floor assembly shall be mounted on top of a three-sided U-shaped wall module consisting at minimum of nominal 2 x 4-in. lumber and two layers of ½-in. thick gypsum wallboard. The sub-floor shall also be covered with two layers of ½-in. thick gypsum wallboard. The module shall consist of three 8-ft long (outside dimensions) walls, each 4-ft high, with a full open space on one side of the structure.

The floor/ceiling above the crawl space shall be built using nominal 2 x 8-in. x 8-ft floor joists on 16-in. centers, with 2 x 8-in. joist headers, all bearing on 2 x 4-in. sill plates and surfaced with 15/32-in. thick, 4-ply, APA graded A-C Southern Pine plywood sub-flooring with a moisture content between 14% and 18%. Moisture content shall be determined by an electrical resistance moisture measurement.

Note: CDX grade plywood shall not be used. (Variability in quality is too high for the comparison required for this evaluation.)

The joists shall be perpendicular to the camera's line-of-sight, so that they tend to dam the flame front and hold it inside the test area. The floor of the test chamber is covered with approximately 1 in. of sand. Figures 1 and 2 provide diagrams showing the construction of the base crawl space module.

3.0 BASELINE ASSEMBLY

The walls or walls and ceiling shall consist of the foam plastic insulation at the thickness and density specified by client. Wall studs and ceiling joist shall be sized to accommodate the requested thickness. The foam plastic in the walls and ceiling shall be covered with ¼-inch number one yellow kiln dried pine plywood with moisture content between 14% and 18%. Moisture content shall be determined by an electrical resistance moisture measurement.

- 3.1 The time to flames out the front (flames breaking the plane of the front face of the assembly) shall be recorded and used to establish the minimum allowed time for comparison
- 3.2 The time to burn-through the ceiling (flames burning through the ceiling of the assembly at any location) shall be recorded and used to establish the minimum allowed time for

comparison

3.3 The testing of the baseline assembly shall be within one week (7days) of the test assembly.

4.0 TEST ASSEMBLY

The walls or walls and ceiling shall consist of the foam plastic insulation at the thickness and density specified by client and equal to the baseline assembly. Wall studs and ceiling joist shall be sized to accommodate the requested thickness and be the same as the baseline assembly. The foam plastic in the walls and ceiling shall be tested exposed or covered/coated in the manner for which is recognition is sought. Density and any other pertinent installation instructions of the foam plastic, any coating and or covering used in testing shall be reported. Applied thickness of the foam plastic, any coating and or covering used in testing shall be measured and reported.

4.1 The time to flames out the front (first flames - intermittent or continuous) breaking the plane of the front face of the assembly shall be recorded. Acceptable performance shall be defined as time longer than the baseline assembly.

4.2 The time to burn-through the ceiling (first flames - intermittent or continuous, burning through the ceiling of the assembly at any location) shall be recorded. Acceptable performance shall be defined as time longer than the baseline assembly.

5.0 IGNITION SOURCE

The fire source is a 22-lb wood crib constructed of nominal 2 x 2-in. lumber (1½-in. square white fir, Douglas fir with a 24 hour conditioned moisture content of 7.5% to 8%. Moisture measured by an electrical resistance moisture measurement), 15-in. square in plane, spaced approximately 1½-in. apart and fastened at right angles with a single nail at each end. The crib is placed in a rear corner of the crawl space 1 in. from each wall surface and supported approximately 4-in. above the floor on small sections of refractory brick. Approximately 150 ml of ethyl alcohol in a metal pan placed under the crib is used for ignition.

6.0 TEST DURATION AND END POINT COMPARISON CRITERIA

The baseline assembly will be burned and the time at which flames start emerging from the front (burn-out the front time) and the time at which there is burn through the ceiling and the location of burn through will be recorded.

The comparative test assembly will be burned and the time at which flames start emerging from the front (burn-out the front time) and the time at which there is burn through the ceiling and the location of burn through will be recorded. The ceiling burn-through test shall be run to failure or five minutes longer than the cut-off time determined from the baseline tests.

The comparative test assembly will be considered to have passed this test if:

- a. The burn (flames) out the front time is longer than the baseline assembly's burn (flames) out the front time (or if the test was terminated at a time five minutes longer than the baseline assembly time); and
- b. The time to burn (flames) through the ceiling is longer than the baseline assembly's burn (flames) through ceiling time (or if the test was terminated at a time five minutes longer than the baseline assembly time).

7.0 DOCUMENTATION

The test report shall include photographs and video documentation positioned to view the entire front of the open side of the module. A timing reference, mechanical or electronic, shall be included in all photographic and video records. The test report shall include photographs, after any needed foam cure time and before the plywood is applied, documenting the thickness of the foam in the baseline assembly (one example is a ruler embedded in the foam showing the thickness). The test report shall include photographs taken the same day and just before the test was run documenting the thickness of the foam in the test assembly (one example is a ruler embedded in the foam showing the thickness). The test report shall include the measured moisture content of all wood used in the testing.

8.0 REPORT

The report shall include:

- Name and location of facility where test is conducted.
- Date of specimen (both baseline and test assembly) construction and date(s) tested.
- A description of the baseline and tested assembly, including:
 - baseline and test assembly construction
 - Description and name of the foam plastic, any coating and/or covering used in testing, included density and measured thickness. If appropriate, application rate and installation procedures shall be reported.
- Photographic and video documentation; pre-test, during (including timing), thickness measurements and post-test.
- The moisture measurements of all wood used in the testing (both baseline and test assembly).
- A summary of visual observations including time to flames exiting the module and/or burn through of the sub-floor assembly.
- Conclusions in the form of a statement of findings summarizing the fire performance of the assembly for which approval is sought compared to the baseline assembly, signed by a representative engineer or officer of the test facility.



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 ($\frac{2}{3}$) 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

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

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



PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR FOAM PLASTIC INSULATION

AC12

Proposed April 2008

Previously approved February 2007, June 2006, February 2005, October 2004,
June 2004, July 2002, January 2002, July 2001, September 2000, July 2000,
September 1999, June 1998, January 1996, January 1995, April 1992,
October 1982, April 1980

PREFACE

Evaluation reports issued by ICC Evaluation Service, Inc. (ICC-ES), are based upon performance features of the International family of codes and other widely adopted code families, including the Uniform Codes, the BOCA National Codes, and the SBCCI Standard Codes. Section 104.11 of the *International Building Code*[®] reads as follows:

The provisions of this code are not intended to prevent the installation of any materials or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.

Similar provisions are contained in the Uniform Codes, the National Codes, and the Standard Codes.

ICC-ES may consider alternate criteria, provided the report applicant submits valid data demonstrating that the alternate criteria are at least equivalent to the criteria proposed in this document, and otherwise meet the applicable performance requirements of the codes. Notwithstanding that a product, material, or type or method of construction meets the requirements of the criteria proposed in this document, or that it can be demonstrated that valid alternate criteria are equivalent to the criteria in this document and otherwise meet the applicable performance requirements of the codes, ICC-ES retains the right to refuse to issue or renew an evaluation report, if the product, material, or type or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or malfunctioning is apt to cause unreasonable property damage or personal injury or sickness relative to the benefits to be achieved by the use of the product, material, or type or method of construction.

Acceptance criteria are developed for use solely for purposes of issuing ICC-ES evaluation reports.

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR FOAM PLASTIC INSULATION

1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish requirements for foam plastic insulation to be recognized in an ICC Evaluation Service, Inc. (ICC-ES), evaluation report under the 2006 *International Building Code*® (IBC), the 2006 *International Fire Code*® (IFC), the 2006 *International Residential Code*® (IRC), the 2006 *International Energy Conservation Code* (IECC), the 1997 *Uniform Building Code*™ (UBC) and the 1997 *Uniform Fire Code*™ (UFC). The bases of recognition are IBC Section 104.11, IRC Section 104.11, and UBC Section 104.2.8.

1.2 Scope: This criteria applies to foam plastic for use in accordance with the applicable code. This criteria also provides acceptable diversified test procedures. Requirements for spray-applied foam plastic insulation are covered in the ICC-ES Acceptance Criteria for Spray-applied Polyurethane Foam Plastic Insulation (AC377).

1.3 Codes and Reference Standards: Where standards are referenced in this criteria, these standards shall be applied consistently with the code upon which compliance is based.

1.3.1 Codes:

1.3.1.1 2006 *International Building Code*® (IBC), International Code Council.

1.3.1.2 2006 *International Fire Code*® (IFC), International Code Council.

1.3.1.3 2006 *International Residential Code*® (IRC), International Code Council.

1.3.1.4 2006 *International Energy Conservation Code*® (IECC), International Code Council.

1.3.1.5 1997 *Uniform Building Code*™ (UBC).

1.3.1.6 1997 *Uniform Fire Code*™ (UFC).

1.3.2 Reference Standards:

1.3.2.1 ASTM International (ASTM):

1.3.2.1.1 ASTM C 177-99, Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus.

1.3.2.1.2 ASTM C 236-89 1993^{el}, Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box.

1.3.2.1.3 ASTM C 518-91, Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

1.3.2.1.4 ASTM C 578-06, Specification for Rigid Cellular Polystyrene Thermal Insulation.

1.3.2.1.5 ASTM C 840-04, Specification for Application and Finishing of Gypsum Board.

1.3.2.1.6 ASTM C 976-90 (1996)^{el}, Test Method for Thermal Performance of Building Assemblies by Means of a Calibrated Hot Box.

1.3.2.1.7 ASTM C 1029-02, Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.

1.3.2.1.8 ASTM C 1289-06, Standard Specification

for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

1.3.2.1.9 ASTM D 1621-00, Test Method for Compressive Properties of Rigid Cellular Plastics.

1.3.2.1.10 ASTM D 1622-98, Test Method for Determining Apparent Density of Rigid Cellular Plastics.

1.3.2.1.11 ASTM D 1623-78 (1995), Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics (Type B Specimen).

1.3.2.1.12 ASTM D 2126-98, Test Method for Response of Rigid Cellular Plastics to Thermal and Rigid Aging.

1.3.2.1.13 ASTM D 2856-94 (1998), Standard Test Method for Open-Cell Content of Rigid Cellular Plastics by the Air Pycnometer.

1.3.2.1.14 ASTM E 84-04, Test Methods for Surface Burning Characteristics of Building Materials.

1.3.2.1.15 ASTM E 119-00, Test Methods for Fire Tests of Building Construction and Materials.

1.3.2.1.16 ASTM E 283-04, Test Method for Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen.

1.3.2.2 Factory Mutual (FM):

1.3.2.2.1 FM 4450-(1989), Approval Standard for Class 1 Insulated Steel Deck Roofs—with Supplements through July 1992.

1.3.2.2.2 FM 4880-(2001), American National Standard for Evaluating Insulated Wall or Wall and Roof/Ceiling Assemblies, Plastic Interior Finish Materials, Plastic Exterior Building Panels Wall/Ceiling Coating Systems, Interior or Exterior Finish Systems.

1.3.2.3 National Fire Protection Association (NFPA):

1.3.2.3.1 NFPA 13-02, Installation of Sprinkler Systems.

1.3.2.3.2 NFPA 259-04, Test Method for Potential Heat of Building Materials.

1.3.2.3.3 NFPA 268-01, Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source.

1.3.2.3.4 NFPA 286-00, Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

1.3.2.4 Underwriters Laboratories (UL):

1.3.2.4.1 UL 723-03, Test for Surface Burning Characteristics of Building Materials, with Revisions through May 2005.

1.3.2.4.2 UL 790-98, Tests for Fire Resistance for Roof Covering Materials, with Revisions through July 1998.

1.3.2.4.3 UL 1256-02, Fire Tests of Roof Deck Construction.

1.3.2.4.4 UL 1040-96, Fire Test of Insulated Wall

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOAM PLASTIC INSULATION

Construction, with Revisions through April 2001.

1.3.2.4.5 UL 1715-97, Fire Tests of Interior Finish Material, with Revisions through October 2002.

2.0 BASIC INFORMATION

The following information shall be submitted:

2.1 Product Description: Complete information concerning material specifications, thickness, size and the manufacturing process.

2.2 Installation Instructions: Installation details and limitations, fastening methods, joint treatments and face treatments.

~~2.2.1 For spray-applied materials, installation instructions shall specify the maximum thickness that can be sprayed with each pass and the maximum number of passes allowed. If more than one spraying is allowed, the report shall include any restrictions, including, but not limited to, curing time and preparation.~~

2.3 Packaging and Identification: A description of the method of packaging and field identification of the foam plastic insulation. Identification provisions shall include the evaluation report number.

2.4 Field Preparation: A description of the methods of field-cutting, application and finishing.

2.5 Testing Laboratories: Testing laboratories shall comply with Section 2.0 of the ICC-ES Acceptance Criteria for Laboratory Accreditation Test Reports (AC85) and Section 4.2 of the ICC-ES Rules of Procedures for Evaluation Reports.

2.6 Test Reports: Test reports shall comply with AC85.

2.7 Product Sampling: Sampling for foam plastic insulation under this criteria shall comply with Section 3.1 of AC85.

3.0 TEST AND PERFORMANCE REQUIREMENTS

3.1 Flame-spread Index: The insulation shall exhibit a maximum flame-spread index of 75 when tested in accordance with ASTM E 84 or UBC Standard 8-1.

3.1.1 Other sections in the codes and this acceptance criteria may alter the maximum allowable flame-spread index.

3.1.2 Except as specifically permitted in IBC Section 2603, IRC Section R314 or UBC Section 2602, foam plastic recognition shall be limited to the maximum thickness and density of the test specimen.

3.2 Smoke-developed Index: The insulation shall exhibit a maximum smoke-developed index of 450 when tested in accordance with ASTM E 84, UL 723 or UBC Standard 8-1. Recognition is limited to the maximum thickness and density of the tested specimen. Testing required to determine the smoke-developed index is waived for roofing insulation under IBC Section 2603.3 (Exception 3), IRC Section R314.5.2 or UBC Section 2602.5.3.

3.3 Noncombustible Construction:

~~3.3.1 General:~~ For purposes of this acceptance criteria, foam plastic is a combustible material. In certain instances, foam plastic is permitted where noncombustible materials are required under IBC Section 2603.5, UBC Section 2602.4 (Exception 3), or UBC Section 2602.5.2. For EPS insulating

concrete forms used in noncombustible construction, see the ICC-ES Acceptance Criteria for Stay-in-place, Foam Plastic Insulating Concrete Form Systems for Solid Concrete Walls (AC353).

~~3.3.2 Foam Plastic Insulation on Solid Concrete Walls:~~ Data shall be submitted as required in IBC Section 2603.5. Solid concrete walls covered with an exterior insulation and finish system (EIFS) may be based on EIFS incorporating steel framing and gypsum sheathing justified for noncombustible construction under the conditions enumerated in Section 3.3.2.1. Flat or waffle-grid insulating concrete form (ICF) (defined in Section R202 of the IRC) solid concrete walls covered with an EIFS lamina may be based on EIFS incorporating steel framing and gypsum sheathing justified for noncombustible construction under the conditions enumerated in Section 3.3.2.2.

~~3.3.2.1 Exterior Solid Concrete Walls Covered with an Exterior Insulation and Finish System:~~ The following data shall be submitted:

~~1. The EIFS shall comply with the ICC-ES Acceptance Criteria for Exterior Insulation and Finish Systems (AC219) or the ICC-ES Acceptance Criteria for EIFS Clad Drainage Wall Assemblies (AC235), and shall be recognized in a current evaluation report for use in noncombustible construction.~~

~~2. An analysis shall be provided demonstrating that the fuel loading, expressed in Btu/ft², of the foam plastic on the exterior side of the concrete wall is less than or equal to the fuel loading of the foam plastic of the assemblies of EIFS with gypsum sheathing and steel framing justified for noncombustible construction. The fuel loading is calculated using the density (lbs/ft³), the thickness (ft.) and the potential heat of the foam plastic insulation (Btu/lb). The potential heat of expanded polystyrene (EPS) foam plastic may be assumed to be 18,000 Btu/pound (41 868 kJ/kg). When the foam plastic polymer is the same as that tested, and the thickness and density of the foam plastic used on the exterior side of the concrete wall are exactly the same or less than those tested, no analysis is required.~~

~~3. An analysis shall be provided by the testing laboratory that conducted the NFPA 285, UBC Standard 26-4 or UBC Standard 26-9 test, or by a qualified individual, addressing the differences in construction details between the tested EIFS assembly, consisting of foam plastic adhered to gypsum board that is mechanically fastened to nonload-bearing steel studs, and the solid concrete wall system, which may be a load-bearing wall. Additionally, the analysis needs to comment specifically on whether the condition of acceptance specified in Section 8-1.6 of NFPA 285 or item 5 of UBC Standards 26-4 and 26-9 will be maintained. Lastly, the analysis needs to identify the coating material, mesh, and finish coat materials (by product name or detailed specifications).~~

~~4. Although the solid concrete wall system will be used in load-bearing assemblies, NFPA 285, UBC Standard 26-4 or UBC Standard 26-9 tests of load-bearing assemblies of solid concrete wall systems are not required where the foam plastic and wall covering are non-stressed elements.~~

~~5. Ignition tests shall be conducted in accordance with NFPA 268 as required by IBC Section 2603.5.7. If the tested assembly differs from the actual assembly (for example, tests provided by an EIFS manufacturer may~~

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOAM PLASTIC INSULATION

incorporate a different density and thickness of foam plastic and different lamina than when application is to concrete walls); an analysis shall be provided demonstrating that the fuel loading, expressed in Btu/ft², of the actual assembly on the exterior side of the concrete wall is less than or equal to the fuel loading of the tested assembly justified for noncombustible construction. The fuel loading for foam plastic insulation is calculated using the density (lbs/ft³), the thickness (ft.) and the potential heat of the foam plastic insulation (Btu/lb). The potential heat of expanded polystyrene (EPS) foam plastic may be assumed to be 18,000 Btu/pound (41 868 kJ/kg). When the foam plastic polymer and the lamina are the same as those tested, and the thickness and density of the foam plastic used on the exterior side of the concrete wall are exactly the same or less than those tested, no analysis is required.

6. Other requirements of IBC Section 2603.5 shall be provided, as applicable.

3.3.2.2 Exterior ICF Wall Systems Covered with EIFS Lamina: The EIFS lamina consists of several components of an EIFS, including base coat, a nonmetallic reinforcing mesh and a finish coat. The system may also include primers, surface sealers, and accessories such as trim corner beads and stops. The following data shall be submitted:

1. Items 1 through 6 of Section 3.3.2.1 shall be provided.

2. A room corner test shall be conducted in accordance with either UL1715 or UBC Standard 26-3, and shall be in compliance with Section 4.5.2 of AC12, which has additional conditions of acceptance regarding excessive smoke (i.e., Section 4.5.2.2.2). The purpose of the test is to ensure that the thermal barrier remains in place for the required 15-minute period, since the thermal barrier is attached to the wall using proprietary methods (i.e., plastic ties). Superimposed axial loads need not be applied to the walls of the test assembly provided the foam plastic is not used structurally.

3. An ICC-ES Consent for Transfer and Use of Specific Articles of Data form shall be provided by each applicable EIFS report holder and the ICF report holder, acknowledging the use of the EIFS lamina over the ICF system.

4. Foam plastic on the interior side of exterior walls shall be discontinuous at floor lines. Details of typical floor-to-wall intersections shall be provided, for inclusion in the evaluation report, showing that the intersections are constructed to prevent the passage of flame, smoke and hot gases from one floor to another.

5. Each piece of ICF foam form shall be labeled on both sides with the evaluation report number, so that, at a minimum, a label shall be visible every 160 square feet (14.72 m²). Alternatively, the pieces may be labeled with the information required by IBC Section 2603.5.6. If forms are intended to be assembled (i.e., opposite faces connected by ties) at the jobsite, each separate piece of foam form shall be labeled.

3.4 Physical Properties:

3.4.1 Faced, Preformed, Rigid Cellular Polyisocyanurate: These materials, including products into

which recycled material is introduced, shall comply with requirements in ASTM C 1289.

Exception: Thermal resistance test results may be less than the minimum values stated in ASTM C 1289, but shall be greater than 90 percent of the minimum values. When the thermal resistance values fall below the minimum value stated in ASTM C 1289, the evaluation report shall report the actual value, and products shall not be labeled as complying with ASTM C 1289 or shall be labeled as complying with ASTM C 1289 except for thermal resistance.

~~**3.4.2 Spray-applied, Rigid Cellular Polyurethane (SPF):** These materials, including products into which recycled material is introduced, shall comply with the physical property requirements in ASTM C 1029, as amended in Table 1 of this criteria. Where the number of test specimens is not specified in the applicable test methods, a minimum of five specimens shall be used.~~

3.4.3 Rigid Cellular Polystyrene: These materials, including products into which recycled material is introduced, shall comply with requirements in ASTM C 578.

Exception 1: Products less than 1 inch (25.4 mm) thick or manufactured with facing material are not required to comply with ASTM C 578, provided the products are limited to nonstructural applications.

Exception 2: Products limited to use as filler on concrete roof decks as described in Section 4.5.15.

3.4.4 Recycled or Recovered Material Qualification: The introduction of recycled or recovered material into ICC-ES recognized foam plastic materials shall be qualified to establish that finished foam plastic insulation with recycled or recovered content meets the requirements of this acceptance criteria. The definitions in Sections 3.4.4.1 through 3.4.4.3 apply.

3.4.4.1 Recovered material means waste material and by-products which have been recovered or diverted from solid waste, but the term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process.

3.4.4.2 Post-consumer waste means material or product that has served its intended use and has been discarded after passing through the hands of a final user. Post-consumer waste is a part of the broader category "recycled material."

3.4.4.3 Recycled material means material that is utilized in place of a raw or virgin material in manufacturing a product, and consists of materials derived from post-consumer waste, industrial scrap, material derived from agricultural waste and other items.

3.4.5 Vapor Retarder: Foam plastic insulation intended to be qualified as vapor retarders shall be tested in accordance with ASTM E 96-00 and shall have a permeance rating of 1 perm (5.7×10^{-11} kg/Pa-s-m²) or less at the intended thickness.

3.5 Compliance without Testing:

3.5.1 Building Components Containing Foam Plastic Insulation: A building component containing an approved foam plastic that can be analytically justified for structural

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOAM PLASTIC INSULATION

compliance with the applicable code, utilizing allowable stresses and loads specified therein, can be recognized without testing under the following conditions:

3.5.1.1 A thermal barrier complying with IBC Section 2603.4, IRC Section R314.4 or UBC Section 2602.4, is provided.

3.5.1.2 Attachment of the thermal barrier is presently justified by tests, or the barrier is permitted to be installed in compliance with specific sections of the applicable code, based on the material involved. One-half-inch-thick (12.7 mm) gypsum wallboard installed in compliance with IRC Table R702.3, UBC Table 25-G, or ASTM C 840 is a specific example of a complying thermal barrier.

3.5.1.3 Sections 3.5.1.1 and 3.5.1.2 do not apply to masonry or concrete elements with cavities containing foam plastic. See IBC Section 2603.4.1.1, IRC Section R314.5.1 or UBC Section 2602.4 (Exception 3).

3.5.1.4 The foam plastic is used where combustible, nonfire-resistive construction is permitted.

3.5.1.5 Durability of facings is not in question.

3.5.2 Patio Covers: Foam plastic insulation used in patio covers, as defined in IBC Section I102.1 of Appendix I, IRC Section AH102 of Appendix H or UBC Section 3116 of Division III of the Appendix to Chapter 31, is permitted to have the thermal barrier and specific approved tests waived under the following conditions:

3.5.2.1 Roof Panels: Roof panels with foam plastic cores are acceptable under IBC Section 2603.6, IRC Section 314.6 or UBC Section 2602.6, without fire sprinklers, under the following conditions:

3.5.2.1.1 The structure is always an appendage to an existing building.

3.5.2.1.2 At least two adjacent exterior elevations shall have openings of at least 65 percent of the area below a 6-foot 8-inch (2032 mm) height.

3.5.2.1.3 A thermosetting foam plastic is used.

3.5.2.1.4 The foam plastic panels have metal skins. Minimum thicknesses of aluminum and steel skins are 0.032 inch and 0.016 inch (0.8 mm and 0.4 mm), respectively.

3.5.2.1.5 The foam plastic core complies with IRC Section 314.3, UBC Sections 2602.1 through 2602.3, or UBC Sections 2603.1 through 2603.3.

3.5.2.1.6 The metal facings encapsulate the foam plastic core.

3.5.2.2 Wall Panels: Wall panels with foam plastic cores are acceptable under IRC Section R314.6 or UBC Section 2602.6, with the following conditions:

3.5.2.2.1 At least two adjacent exterior elevations have openings of at least 65 percent of the area below a 6-foot 8-inch (2032 mm) height.

3.5.2.2.2 Panels are limited to the following exterior wall locations:

3.5.2.2.2.1 Kick plates and knee walls up to 30 inches (762 mm) in height.

3.5.2.2.2.2 Full-height corner panels with a maximum horizontal dimension of 16 inches (406 mm) at each end of an elevation.

3.5.2.2.2.3 Filler panels up to 16 inches (406 mm) deep above openings.

3.5.2.2.3 Wall panels are nonbearing.

3.5.2.2.4 The foam core is encapsulated in metal skins, including vertical edges. No horizontal joints are permitted between the floor and the roof line. Minimum metal skin thicknesses are 0.032 inch (0.8 mm) for aluminum or 0.016 inch (0.4 mm) for steel.

3.6 Patio Cover Sandwich Panels:

3.6.1 General: For patio covers as defined in IBC Appendix I, IRC Appendix H and Division III of UBC Appendix Chapter 31, sandwich panels with foam plastic cores that are used as roof or wall panels of patio covers shall also comply with this section of this criteria.

3.6.2 Thermal Barriers: Except as permitted under Section 3.5.2 of this criteria, the sandwich panels shall be installed with a thermal barrier complying with this criteria and the applicable code, or the panels shall be subjected to a room corner fire test complying with Sections 4.5.2, 4.5.4.2, and 4.5 of this criteria.

The panels used in the room corner fire tests shall have the maximum foam plastic thickness for which recognition is sought. Test assemblies of roof panels shall include a longitudinal seam between adjacent roof panels located as close to the centerline of the wood crib as permitted by the evaluation report applicant's published installation instructions. If the roof panel longitudinal seam in the test assembly is not directly over the centerline of the wood crib, the distance from the seam to the interior face of the wall parallel to the seam shall be specified in the evaluation report as a minimum distance. Superimposed design loads do not need to be exerted on the room corner fire test assembly, provided the panels' use is limited Type V construction, and the panels are not required to be fire-resistance rated. Sealants shall not be applied to the interior face of the panel joints fire test assembly, unless the durability of the sealants is demonstrated with submitted independent data.

3.6.3 Roof Classification: For recognition under the IBC, compliance with IBC Section 2603.6 needs to be demonstrated by testing in accordance with ASTM E 108 or UL790. For recognition under the IRC, roof classification tests are not required, provided recognition is limited to installations permitting a nonclassified roof covering under IRC Section R902. For recognition under the UBC, reports of tests in accordance with UBC Standard 15-2 are needed only if the roof panels are to be recognized with a roof classification.

4.0 TESTS METHODS

4.1 Thermal Barrier Index Requirements: An approved thermal barrier shall have an index of 15 or greater and shall be qualified to remain in place for the time of its index classification.

4.1.1 UBC: The index classification shall be determined in accordance with UBC Standard 26-2. The small-scale furnace specified therein shall be recognized by ICC-ES.

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOAM PLASTIC INSULATION

Recognition involves evaluating small-scale test results on a specimen that has previously been tested as a component of a full-scale fire-resistive assembly. The intent is to compare temperatures between the unexposed surface of the small-scale assembly and the full-scale assembly tested in accordance with UBC Standard 7-1. A complete report of test, including temperature readings, is required for each test. At least three additional thermocouples are necessary between the interface of gypsum wallboard and wood studs, if this type of assembly is used for calibration.

4.1.2 IBC and IRC: The index classification shall be determined by exposing the thermal barrier to testing in accordance with ASTM E 119 for a minimum of 15 minutes. The condition of acceptance is that the average rise from ambient temperature at the beginning of the test is not more than 250°F (120°C).

4.2 Foam Plastics in Structural Elements: Thermal barriers for structural elements utilizing foam plastic in supporting superimposed loads shall be qualified in accordance with one of the following:

4.2.1 ASTM E 119 or UBC Standard 7-1 for the required 15-minute time period. The structural element is tested with superimposed loads applied as set forth in ASTM E 119 or Section 7.111 or 7.125 of UBC Standard 7-1. The hose stream test shall be waived.

4.2.2 Section 4.5.3 of this criteria as an alternate to ASTM E 119 or UBC Standard 7-1 for nonfire-resistive construction.

4.3 Foam Plastics in Nonbearing Walls and Ceilings: Thermal barriers for foam plastics in nonbearing walls and ceilings shall be qualified with one of the following:

4.3.1 Section 4.5.2 for room test.

4.3.2 Section 4.2.1, except for superimposed loads.

4.3.3 Thermal barriers referenced and installed as set forth in Chapter 8 or 7 of the IBC or UBC.

4.3.4 Testing in accordance with ASTM E 119 or UBC Standard 26-2, horizontally when installed over foam plastic in a manner representative of actual field installation. Thermal barriers shall be adhesively applied and have an index of at least 30. The following exceptions apply to the prescribed test method:

4.3.4.1 The thermal barrier is to be tested over the specific foam plastic substrate for which recognition is sought. This is in lieu of the 1/2-inch-thick (12.7 mm) calcium silicate board that would otherwise be required.

4.3.4.2 The test sample shall always be tested in the horizontal, inverted position with attachment of the thermal barrier as intended for recognition in the evaluation report. The thermal barrier shall be clear of the shelf that supports the test specimen. This shall be specifically described in the report of tests. The test shall be conducted for a minimum 30-minute period, with the furnace temperature following the time-temperature curve in ASTM E 119 or UBC Standard 7-1. The furnace temperature at 30 minutes shall be 1550°F (843°C).

4.4 Foam Plastic Drop-out Ceiling Panels and Tiles: The interior finish materials are used in metal ceiling suspension systems complying with the IBC or UBC. The following requirements are the bases of recognition in ICC-ES evaluation reports for the panels and tiles:

4.4.1 Flame-spread and smoke-density indices shall not exceed 25 and 450, respectively, when tested in conformance with ASTM E 84, UL 723 or UBC Standard 8-1.

4.4.2 Recognition under IBC Section 2606.7 or UBC Section 2603.8 shall be permitted.

4.4.3 Installation is prohibited in exits such as corridors, stairways, horizontal exits, pressurized enclosures and exit passageways as defined in Chapter 10, and malls as defined in Chapter 4, of the UBC.

4.4.4 Room fire tests shall be conducted in accordance with Sections 4.5.2 and 4.5.4 of this criteria, and shall comply with the conditions of acceptance specified therein.

4.4.5 Labels on packages and containers of panels and tiles shall comply with IBC Section 2603.2 or UBC Section 2602.2. In addition, the evaluation report number shall be on the edge of each panel and tile.

4.4.6 Prescriptive Requirements:

4.4.6.1 Panels and tiles shall be used only in a horizontal arrangement.

4.4.6.2 Panels and tiles shall remain unpainted or otherwise uncoated, unless approved otherwise.

4.4.6.3 Restraining clips shall not be used to hold the panels or tiles in their suspension frame unless the tests required under Section 4.4 of this criteria are conducted on installations with the clips.

4.4.6.4 The space above the panels and tiles shall not be used as an air circulation plenum.

4.4.7 When automatic sprinklers are installed, panels and tiles recognized under IBC Section 2606.7 or UBC Section 2603.8, as specified in Section 4.4.2 of this criteria, may be installed as drop-out ceiling tiles and panels in light hazard and Group 1 ordinary hazard occupancies, as defined in NFPA 13 or Section 1-4.7 of UBC Standard 9-1. The ceiling tiles and panels are installed beneath the sprinklers without sprinklers below the ceiling under the following conditions that are in addition to those in Section 4.4.6 of this criteria:

4.4.7.1 The ceiling tiles and panels shall be listed as drop-out ceilings and shall be installed in accordance with the listing.

4.4.7.2 Drop-out panels and tiles shall not be used in conjunction with dry-pipe sprinkler system deflectors.

4.4.7.3 Panels and tiles shall be located no more than 5 feet (1524mm) below the sprinklers.

4.4.7.4 The sprinklers are installed above the ceiling in accordance with NFPA 13 or UBC Standard 9-1, including separation from obstructions.

4.4.7.5 Tests shall be conducted to demonstrate that the panels and tiles fall from their mounting at or below 425°F (218°C) when tested as follows: One 2-foot-by-4-foot (610 mm by 1219 mm) ceiling panel or two 2-foot-by-2-foot (610 mm by 610 mm) ceiling panels shall be installed in a typical suspension frame located at the top of a 4-foot-by-4-foot-by-2-foot-high (1219 mm by 1219 mm by 610 mm) enclosure. The ceiling panel(s) make up one half of the ceiling of the enclosure; the remaining half consists of either a mineral composition board or additional ceiling panel(s). The enclosure shall be located 12 inches (305 mm) above

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOAM PLASTIC INSULATION

the floor. A radiant heat source shall be placed centrally under the mineral composition board and ignited. The temperature profile shall be per Table 2.1. However, when the panels begin to melt or distort, the heat will vent and it may not be possible to maintain the specific profile. If this is the case, the temperature shall be maintained as close as possible to the specific profile. A thermocouple located in the center of the enclosure and located 1 inch (25 mm) below the ceiling shall be used to monitor the temperature at the ceiling.

4.4.7.6 Ceiling tiles and panels are installed in metal suspension systems that provide the same amount of support for the tiles and panels as the suspension members used in the tests.

4.4.7.7 Insulation shall not be placed in the area above the drop out ceiling panels and tiles, or beneath the automatic sprinklers.

4.5 Special Comments on Testing:

4.5.1 Full-scale Corner Fire Tests: Full-scale corner tests for nonbearing wall panels, based on Factory Mutual's building corner fire test procedure 4880 or the Underwriters Laboratories test procedure described in UL Standard 1040. These tests involve walls up to 30 feet (9144 mm) high and 50 feet (15 240 mm) long with 750- to 800-pound (340 to 365 kg) wood cribs. Recognition by these tests is limited by Section 4.5.10.2 of this criteria.

4.5.2 Room Tests: Room test for nonbearing walls and ceilings:

4.5.2.1 Testing shall comply with UL 1715 or UBC Standard 26-3, except for the following:

4.5.2.1.1 The 1/2-inch-thick (12.7 mm) asbestos cement board room liner is permitted to be replaced with other materials with equivalent or superior thermal insulation characteristics.

4.5.2.1.2 Where the foam plastic material, in its tested thickness, has an *R* value of 25 or more, the asbestos cement substrate is permitted to be deleted under the following conditions:

4.5.2.1.2.1 There is no burning completely through the foam during the test.

4.5.2.1.2.2 Absence of the substrate does not affect the installation of thermal barriers or other coverings over the foam plastic.

4.5.2.1.3 Foam plastic products shall be tested at the maximum thickness and density anticipated for use. Variations in facing materials from that tested can be considered, provided they are equivalent to the facing tested. Justifying data shall include comparative testing of the facings on foam plastic in accordance with ASTM E 84, UL 723 or UBC Standard 8-1.

4.5.2.2 Conditions of acceptance shall comply with UL 1715 or UBC Standard 26-3, except for the following:

4.5.2.2.1 When it can be determined that discoloration is not due to charring, the 1/4-inch (6.4 mm) limit in Item 1 of UBC Section 26.304 is not applicable.

4.5.2.2.2 Determination of excessive smoke levels shall be as set forth in Section 4.5.4 of this acceptance criteria.

4.5.3 Options for Nonfire-resistive Construction: As

an option in nonfire-resistive construction where loading is feasible, the room test is permitted to be used to justify bearing walls, floors, roofs and ceilings, subject to prior approval. The manner of loading shall be described in detail and shall result in maximum allowable design stress conditions under dead, live and snow loads. Under this proposal, the condition for acceptance is that the system sustain the applied load during the test. UL 1715 or Section 26.302 of UBC Standard 26-3 permits this type of testing and exempts loading for Type V-N construction.

4.5.4 Smoke Determination:

4.5.4.1 General: Smoke determination shall consider the following:

4.5.4.1.1 Smoke-density measurements of the foam plastic system under ASTM E 84 or UBC Standard 8-1 in the most critical manner of installation.

4.5.4.1.2 Visual documentation (movies, videotapes) of the smoke generated during the room test. Where an obviously high level of smoke is generated during the test, the product will be considered unacceptable. Any questionable level, as determined by ICC-ES, will be deemed unacceptable, since the present state of the art does not submit to a precise pass-fail criteria. ICC-ES reserves the right to reject visual documentation, if of poor quality. One copy of visual documentation will be retained by ICC-ES for reference purposes.

4.5.4.2 Video Recording: Test Protocol for Video Recording of UL 1715 or UBC Standard 26-3 tests:

4.5.4.2.1 A 300-watt flood-type, quartz halogen lamp shall be positioned in the corner diametrically opposite the crib, near the floor level. The lamp shall be aimed at the wall corner/ceiling intersection above the crib or burner.

4.5.4.2.2 A video camera with a mechanically adjustable iris, adjusted to prevent automatic closing of the iris opening due to brightness of the fire (at least 50 percent open), shall be used. A video monitor shall be used to determine when adjustments and compensation for the brightness of the ignition flames are needed.

The camera mount shall be adjusted so that the camera lens is approximately 3 feet (914 mm) from the floor.

The camera angle and magnification shall be adjusted until the top of the doorway and the top of the crib or burner are visible and the ceiling area directly above the fire is in full view.

4.5.4.2.3 For each test, when the test is for wall systems only, a new section of uncoated and unpainted 5/8-inch (15.9 mm) gypsum wallboard, 2 feet by 2 feet (610 mm by 610 mm), shall be installed in the ceiling at the wall corner intersection directly above the crib.

4.5.4.2.4 A clock or timer depicting "real time" shall be included in all videos. The timer may be integral to the video camera, or a clock/timer is permitted to be used, providing it can be clearly viewed throughout the test period. For the UL 1715 or UBC Standard 26-3 test, the start of the test shall be when the alcohol-soaked excelsior is ignited.

4.5.4.2.5 Immediately prior to ignition of the crib or burner, the date and laboratory test report identification number shall be filmed.

4.5.4.2.6 The test report shall be in sufficient detail to provide:

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOAM PLASTIC INSULATION

4.5.4.2.6.1 Description of the room test setup, with details.

4.5.4.2.6.2 Test observations, commencing with crib ignition and ending with a final description of panels after all combustion ceases.

4.5.4.2.6.3 Thermocouple readings.

4.5.4.2.6.4 Statement of passing or failing.

4.5.4.2.6.5 Photographic record of tests.

4.5.4.2.6.6 Small sample of the protective covering or panel.

4.5.5 Potential Heat Content: Where the potential heat content of foam plastic is required, values shall be determined in accordance with NFPA 259 or UBC Standard 26-1.

4.5.6 Ignition: Where ignition properties for foam plastic are required, values shall be determined in accordance with NFPA 268 or UBC Standard 26-4 or 26-9.

4.5.7 Determination of Thermal Resistance: Thermal resistance shall be determined in accordance with the applicable specification for the product. When a specification for the product does not exist, or when the specification does not address testing and conditioning of samples for thermal resistance testing, thermal resistance shall be determined in accordance with Sections 4.5.7.1 through 4.5.7.5.

4.5.7.1 Thermal resistance of foam plastic insulation shall be determined by tests conducted in accordance with ASTM C 177, C 236 or C 976. ASTM C 236 and ASTM C 976 are guarded hot plate or guarded hot box methods, intended for assemblies or nonhomogeneous insulations. Determination by heat-flow meters under ASTM C 518 is permitted with evidence of calibration in accordance with the standard, properly documented and certified by the testing agency. This includes a description of the control samples used and the last date of calibration prior to testing of the foam plastic insulation.

4.5.7.2 The reporting of thermal resistance shall be based on a mean-test temperature of 75°F ± 5°F (23.8°C ± 2.8°C). Supplemental thermal-resistance values at other mean temperatures are permitted to be included.

4.5.7.3 Recognition of thermal-resistance values for a range of thicknesses shall be established at the thinnest, thickest and mid-thicknesses, to establish a representative curve for interpolation purposes.

4.5.7.4 Tests for thermal resistance of foam plastics utilizing expanding agents, other than air or pentane, shall be performed on samples aged or conditioned in one of the following manners:

4.5.7.4.1 Conditioning at 140°F (60°C) dry heat, ± 2°F (1°C), for 90 days.

4.5.7.4.2 Aging at 70°F ± 10°F (21.1°C ± 5.5°C) in free air for a two-year period.

Exception: ~~Spray-applied, rigid, cellular polyurethane foam plastics are permitted to be conditioned and tested in accordance with Section 10.1 of ASTM C 1029. This conditioning method, when used, shall be stated in the evaluation report describing thermal resistance.~~

4.5.7.5 Description of test samples shall include details of facings, if so tested. Thermal-resistance values will be related to test specimens. Test results on unfaced specimens are permitted to be used for insulation with facings.

4.5.8 Mechanical Fasteners in Foam Plastic Insulation: Appropriate tests shall be conducted to determine the allowable shear of mechanical fasteners, such as nails, through the foam plastic insulation to attach exterior wall coverings to framing members or structural sheathing. Nails and staples in wood are limited to a 0.015-inch (0.38 mm) movement.

Exception: Attachment of conventional wood, metal or plastic siding through insulation not exceeding a 1¹/₂-inch (38 mm) thickness, with sufficient penetration of fasteners into structural framing or structural sheathing beneath.

4.5.9 Foam Plastic Insulation Protection: Thermal barriers and other protective components shall be protected, in an approved manner, for foam plastics exposed to damage from moving vehicles, the handling of merchandise, or similar activities.

4.5.10 Specific Conditions of Acceptance: ICC-ES Evaluation Committee consideration of foam plastic assemblies has resulted in the following conditions of acceptance:

4.5.10.1 Recognition of specific assemblies by approved testing under IBC Section 2603.9, IRC Section R314.6 or UBC Section 2602.6 without fire-extinguishing systems.

4.5.10.2 Assemblies justified only by full-scale corner tests are permitted to be located only in areas with a minimum clear ceiling height of 20 feet (6096 mm). See Section 4.5.1.

4.5.10.3 Under the UBC only, foam plastic insulation is permitted to be placed over combustible, fire-resistive walls without negating the fire-resistive rating.

4.5.10.4 Specific assemblies under other ICC-ES acceptance criteria.

4.5.11 Special Conditions:

4.5.11.1 Foam plastic roofing insulation or components shall be separated from the interior of the building as set forth in IBC Section 2603.4.1.5, IRC Section R314.5.2, UBC Section 2602.5.3 or the equivalent. For metal roof decks, acceptable separation from the building interior is permitted to be determined by testing in accordance with FM 4450, UL 1256, Items 3.2 and 3.3 of UBC Section 601.3 or the Acceptance Criteria for Foam Plastic Insulation Applied Directly to Steel Decks (AC142).

4.5.11.2 Foam plastic cores for doors shall comply with IBC Sections 2603.4.1.7 and 2603.4.1.8, IRC Section R314.5.5 or R314.5.6, and UBC Section 2602.5.4.

4.5.11.3 Foam plastic trim shall comply with IBC Section 2604, IRC Section R314.5.9 or UBC Section 601.5.5.

4.5.11.4 Recognition of specific products or systems is permitted to be based on end use, quantity, location and similar considerations, where testing described in Section 3 of this criteria is not applicable or practical.

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOAM PLASTIC INSULATION

4.5.11.5 Foam Plastic Used in Attic and Crawl Spaces:

4.5.11.5.1 Attics: Within an attic or crawl space where entry is made only for service of utilities and where there are no heat-producing appliances, foam plastics are permitted to be protected as set forth in IBC Section 2603.4.1.6, IRC Section R314.2.3 or Exception 4 of UBC Section 2602.4. Variations from the specified conditions in attics and underfloor areas are permitted to be considered based upon diversified testing approved by ICC-ES prior to testing.

4.5.11.5.1.1 Foam plastic insulation installed in attics where entry is made only for service of utilities shall be protected by an ignition barrier as set forth in IBC Section 2603.4.1.6, IRC Section R314.5.3 or Exception 4 of UBC Section 2602.4, except as noted in Section 4.5.11.5.1.2. Utilities include, but are not limited to, mechanical equipment, electrical wiring, fans, plumbing, gas or electric hot water heaters, and gas or electric furnaces.

4.5.11.5.1.2 The ignition barrier shall not be required when satisfactory testing is conducted in accordance with either Section 4.5.11.5.1.2.1 or 4.5.11.5.1.2.2.

4.5.11.5.1.2.1 For Use on Walls or Floors of Attics or the Underside of Roof Deck with Limitations Noted in Section 4.5.11.5.1.2.3.2: Tests shall be conducted in accordance with NFPA 286 with the conditions of acceptance specified in IBC Section 803.2; or UL 1715 or UBC Standard 26-3 with conditions of acceptance as specified in Section 4.5.2 of AC12. The tests shall be conducted with the foam plastic installed in the manner for which recognition is sought over the gypsum wallboard or glass-reinforced cement board as described in the standard.

4.5.11.5.1.2.2 For Use on Walls or Floors of Attics or the Underside of Roof Deck with Limitations Noted in Section 4.5.11.5.1.2.3.1: Comparative room corner fire tests shall be conducted in accordance with the test procedures of NFPA 286, UL 1715 or UBC Standard 26-3. The foam plastic insulation shall be applied in the manner for which recognition is sought. The interior face of the control assembly shall consist of 1/4-inch-thick interior CDX grade plywood applied to the interior face of wood wall framing (plywood is permitted by IBC section 2603.4.1.6, IRC section R314.5.3 and UBC Section 2602.4, Exception 4, as a protective material for foam plastic located in attics.) The exterior face shall be covered with 3/8-inch-thick exterior plywood. The second test assembly shall be identical, but without plywood on the interior face of the wall. Conditions of acceptance shall consider the time-to-failure of the control test assembly, as evidenced by flashover, which is flame exiting the door opening. The second assembly with exposed foam plastic shall be tested for at least the same duration of time. A successful comparison is based on no flashover of the second assembly within the time-to-failure of the control test assembly.

4.5.11.5.1.2.3 Limitations on Attic Installations:

4.5.11.5.1.2.3.1 When testing is in accordance with Section 4.5.11.5.1.2.2, the evaluation report shall include the following limitations:

a. Entry to the attic is only to service utilities and no storage is permitted.

b. There are no interconnected attic areas.

c. Air in the attic is not circulated to other parts of the building.

d. Attic ventilation is provided in accordance with IBC Section 1203.2 or IRC Section R806, as applicable.

e. The foam plastic insulation is limited to the maximum thickness and density tested.

4.5.11.5.1.2.3.2 When testing is in accordance with Section 4.5.11.5.1.2.1, the evaluation report shall include the following limitations:

a. No storage is permitted.

b. Attic ventilation is provided in accordance with IBC Section 1203.2 or IRC Section R806, as applicable.

c. Combustion air is provided in accordance with IMC Sections 701 and 703.

d. The foam plastic insulation is limited to the maximum thickness and density tested.

4.5.11.5.2 Crawl Spaces:

4.5.11.5.2.1 Foam plastic insulation installed in a crawl space where entry is made only for service of utilities shall be protected by an ignition barrier as set forth in IBC Section 2603.4.1.6, IRC Section R314.5.4 or Exception 4 of UBC Section 2602.4, except as noted in Section 4.5.11.5.2.2. Utilities include, but are not limited to, mechanical equipment, electrical wiring, fans, plumbing, gas or electric hot water heaters, and gas or electric furnaces.

4.5.11.5.2.2 The ignition barrier shall not be required when satisfactory tests are conducted in accordance with either Section 4.5.11.5.2.2.1 or Section 4.5.11.5.2.2.2.

4.5.11.5.2.2.1 For Use on Walls of Crawl Spaces or the Underside of Floors in a Crawl Space with Limitations as Noted in Section 4.5.11.2.2.3.2: Tests shall be conducted in accordance with NFPA 286 with the conditions of acceptance specified in IBC Section 803.2; or in accordance with UL 1715 or UBC Standard 26-3 with conditions of acceptance as specified in Section 4.5.2 of AC12. The tests must be conducted with the foam plastic installed, in the manner for which recognition is sought over the gypsum wallboard or glass-reinforced cement board as described in the standard.

4.5.11.5.2.2.2 For Use on Walls of Crawl Spaces or the Underside of Floors in a Crawl Space with Limitations Noted in Section 4.5.11.5.2.2.3.1: Comparative crawl space fire tests shall be conducted where the performance of the exposed foam plastic insulation is compared under identical test conditions to that of the foam plastic insulation covered with a code-approved ignition barrier. See IBC Section 2603.4.1.6 and IRC Section R314.5.4 for the prescriptive list of ignition barriers. The time to flash over and the time to burn through the wood-framed floor/ceiling must be equal or greater for the exposed foam plastic insulation versus the foam plastic insulation covered with the ignition barrier.

4.5.11.5.2.2.3 Limitations on Crawl Space Applications:

4.5.11.5.2.2.3.1 When testing is in accordance with Section 4.5.11.5.2.2.2, the evaluation report shall include the following limitations:

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOAM PLASTIC INSULATION

a. Entry to the crawl space is only to service utilities and no storage is permitted.

b. There are no interconnected crawl space areas.

c. Air in the crawl space is not circulated to other parts of the building.

d. Under-floor (crawl space) ventilation is provided in accordance with IBC Section 1203.3 or IRC Section R408.1, as applicable.

e. The foam plastic insulation is limited to the maximum thickness and density tested.

4.5.11.5.2.3.2 When testing is in accordance with Section 4.5.11.5.2.2.1, the evaluation report shall include the following limitations:

a. No storage is permitted.

b. Under-floor (crawl space) ventilation is provided in accordance with IBC Section 1203.3 or IRC Section R408.1, as applicable.

c. Combustion air is provided in accordance with IMC Sections 701 and 703.

d. The foam plastic insulation is limited to the maximum thickness and density tested.

4.5.11.5.23 **Ventilation Requirements under the IRC:** Attic ventilation is not required. Unvented, conditioned attic assemblies are permitted under the conditions prescribed in IRC Section 806.4, provided reports of tests in accordance with ASTM E 283 are submitted, with the test procedure modified as follows:

1. The test frame shall be a minimum of 24 inches square, and a 1/2-inch-thick low-density fiberboard substrate fastened and sealed on one side. The fiberboard shall have a minimum air permeance of 1.0 L/s-m².

2. The foam plastic insulation shall be applied in the minimum thickness for which recognition is sought.

3. The test pressure difference shall be 75 Pa (1.57 lb/ft²).

4. Air flow shall be by both infiltration and exfiltration.

5. Total air leakage shall be reported as the larger result from the infiltration and exfiltration tests.

6. Air impermeable is defined as a maximum total air leakage rate of 0.02 L/s-m².

~~Crawl space ventilation is not required~~ Unvented crawl spaces are permitted required under the conditions prescribed in IRC Section R408.3.

4.5.11.6 Foam plastic roofing insulation shall be part of a tested Class A, B or C assembly under UL 790 or UBC Standard 15-2.

4.5.12 Exterior Wall-covering Systems: Exterior wall covering systems with foam plastic components shall comply with this criteria. Special requirements for cementitious exterior wall coatings over foam plastic are set forth in a companion document.

4.5.13 Foam Plastic Insulation Used as Decorative Material: Use of foam plastic as a decorative material attached to the building can be considered under IFC

Section 807 or UFC Section 1103.3.3.

4.5.14 Foam Plastic Insulation Used over Concrete Roof Decks: Polystyrene foam plastic insulation used as filler on concrete roof deck surfaces shall be evaluated in accordance with ASTM C 578 and comply with the physical property requirements in Table 1 of ASTM C 578 for compressive strength. Other physical property requirements in Table 1 of ASTM C 578 shall be determined by the test results. All minimum physical property requirements shall be specified in the quality control manual. The flat-surfaced product shall be limited to placement over solid, flat concrete roof decks and be labeled to restrict the product to this application.

4.5.15 Qualification to ASTM C 578: Data required by Section 3.4.3 of this criteria shall be submitted in accordance with either Section 4.5.15.1 or 4.5.15.2. The number of test specimens shall be as specified in the applicable test standard.

4.5.15.1 Option 1: The resin supplier qualifies each resin grade and the evaluation report applicant (proponent) demonstrates an equivalent product can be manufactured at each manufacturing location.

4.5.15.1.1 The resin supplier shall submit reports of testing showing compliance with all requirements of ASTM C 578 for each resin grade requested, and for each Type requested.

Exception: Oxygen index testing is only required on one type per resin grade.

4.5.15.1.2 For boards manufactured with any one of the resin grades already qualified by the resin supplier under Section 4.5.15.1.1, the proponent shall submit reports of testing demonstrating compliance with the flexural strength, compressive strength and density requirements of ASTM C 578 for each type and each manufacturing plant to be recognized in the evaluation report.

4.5.15.1.3 In addition to the information required in Sections 5.1, 5.2 and 5.5 of this criteria, the quality control program shall assure continued compliance with ASTM C 578. The quality control program shall verify flexural strength, compressive strength (required for extruded polystyrene only), density and the presence of fire-retardant-modified resins at each inspection by the inspection agency. Over time, the testing shall incorporate tests to address all types and resin grades.

4.5.15.2 Option 2: No data is submitted by the resin supplier; therefore, the proponent shall demonstrate full compliance with ASTM C 578.

4.5.15.2.1 Reports of testing shall be submitted demonstrating compliance with all requirements of ASTM C 578 for each type and each resin grade, from product produced at one manufacturing location.

Exception: Oxygen index testing is only required on one density per resin grade.

4.5.15.2.2 For boards manufactured with any one of the resin grades already qualified under Section 4.5.15.2.1, the proponent shall submit reports of testing demonstrating compliance with the flexural strength, compressive strength and density requirements of ASTM C 578 for each type and each manufacturing plant to be recognized in the evaluation report.

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOAM PLASTIC INSULATION

4.5.15.2.3 In addition to the information required in Sections 5.1, 5.2 and 5.5 of this criteria, the quality control program shall assure continued compliance with ASTM C 578. The quality control program shall verify flexural strength, compressive strength (required for extruded polystyrene only), density and the presence of fire-retardant-modified resins at each inspection by the inspection agency. Over time, the testing shall incorporate tests to address all types and resin grades.

4.5.16 Qualification to ASTM C 1289: Data required by Section 3.4.2 of this criteria shall be submitted in accordance with Sections 4.5.16.1 through 4.5.16.2. The number of test specimens shall be as specified in the applicable test standard.

4.5.16.1 Reports of testing of product made at one manufacturing location shall be submitted showing compliance with all requirements of ASTM C 1289, for each type and class, except as permitted in Section 3.4.2.

4.5.16.2 For products manufactured at more than one location, the manufacturer shall submit reports of testing demonstrating compliance with the flexural strength (modulus of rupture and break load) and tensile strength requirements of ASTM C 1289 for each type and class at each manufacturing plant to be recognized in the evaluation report. These products shall be manufactured under a common quality control program and shall be made from the same base materials.

4.5.16.3 In addition to the information required in Sections 5.1, 5.2 and 5.5 of this criteria, the quality control program shall assure continued compliance with ASTM C 1289.

5.0 QUALITY CONTROL

5.1 Quality Control Program: The products shall be manufactured under an approved quality control program with inspections by an inspection agency accredited by the International Accreditation Service (IAS) or as otherwise acceptable to ICC-ES.

5.2 Quality Documentation: Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted.

5.3 Identification: Identification shall comply with IBC Section 2603.2, IRC Section R314.2 or UBC Section 2602.2. For foam plastic insulation used with exterior wall coatings on walls required to be of noncombustible construction, the following identification methods are permitted in lieu of IBC Section 2603.5.6 or Item 6 of UBC Section 2602.5.2.2: Each insulation board shall be identified along one edge, and one board from each insulation package shall be identified on both faces, with the following information:

5.3.1 Exterior coating company name and the evaluation report number.

5.3.2 Identification required by the evaluation report covering the block molder of the insulation board.

5.3.3 In lieu of the exterior coating company name and evaluation report number mentioned in Section 5.3.1, special identification for board specifications acceptable to a group of exterior coating companies is permitted to be used, provided the specifications and identification are

addressed in the exterior coating evaluation report or the report covering the block molder.

5.4 Foam Plastic Insulation in EIFS: Block molders shall be covered by a specific ICC-ES evaluation report, or have quality control and listing information submitted and recognized under exterior insulation and finish system (EIFS) reports. Under the latter arrangement, recognition of the block molder's product is confined to those specific evaluation reports on EIFS for which the data has been submitted.

5.5 Quality Control Details: The inspection agency shall provide satisfactory evidence on the foam plastic formulation, the method of manufacturing the foam core, and the specifications for facings and adhesives for samples used in determining flame-spread and smoke-developed indices. In the absence of information released by the manufacturer, the inspection agency must conduct necessary tests to make this determination. The inspection agency shall provide reasonable assurance through quality control procedures and inspections that a manufactured product is the same as samples used in qualifying flame-spread tests.

5.6 Recycled and Recovered Materials: The quality control manual shall describe the process of introducing recycled or recovered material, including cleanliness and proportioning controls. The inspection agency shall provide reasonable assurance, through quality control procedures outlined in the manual and through inspections, that a manufactured product is the same as samples used in qualifying tests. Use of recovered or recycled material in finished foam plastic insulation shall be addressed in the quality control procedures.

6.0 EVALUATION REPORT RECOGNITION

6.1 The evaluation report shall include, at a minimum, the IBC, IRC and IECC within the evaluation scope, except when the report is limited to recognition under the IRC.

6.2 The evaluation report shall state all of the following *R*-values at a mean test temperature of 75°F ± 5°F for the insulation:

- a. at the maximum thickness recognized in the evaluation report
- b. at a 1-inch thickness
- c. and at intermediate thicknesses when the *R*-value is not linear with respect to thickness.

6.3 For spray-applied insulation, the evaluation report shall include a condition of use that jobsite labeling shall comply with IRC Section N1101.4.1.

6.4 The evaluation report shall state the construction types for which the insulation has been evaluated.

6.5 The evaluation report shall state whether the insulation is a vapor retarder. When the insulation has not been tested, or does not meet the requirements for a vapor retarder, the evaluation report shall state that a vapor retarder shall be installed as required in the applicable code.

6.6 When recognition includes installation in attics and crawl spaces, the evaluation report shall state the requirements for ventilation. ■

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOAM PLASTIC INSULATION

TABLE 1—PHYSICAL PROPERTIES OF SPRAY-APPLIED POLYURETHANE FOAM PLASTIC (SPF) INSULATION BY APPLICATION

APPLICATION	TESTS REQUIRED	VALUE	
Nonstructural	Thermal Resistance at 75°F mean temperature. One of the three test methods listed below shall be used: ASTM C 177 ASTM C 236 ASTM C 518	As reported	
	Core Density: ASTM D 1622	0.5 - 1.0 lb/ft ³	
	Fensile Strength: ASTM D 1623	5 lb/in ² , minimum	
	Note: Closed cell content shall be determined in accordance with ASTM D 2856	Minimum closed cell content of 90%	5 lb/in ² , minimum
		Closed cell content less than 90%	3 lb/in ² , minimum
	Dimensional Stability: ASTM D 2126	15% maximum total change	
Surface Burning Characteristics: IBC—ASTM E 84 or UL 723 UBC Standard 8-1	75 flame-spread index or less; 450 smoke-developed index or less		
Structural	Thermal Resistance at 75°F (24°C) mean temperature. One of the three test methods listed below shall be used: ASTM C 177 ASTM C 236 ASTM C 518	As reported	
	Core Density: ASTM D 1622	1.5 - 3.0 lb/ft ³	
	Fensile Strength: ASTM D 1623	15 lb/in ² , minimum	
	Dimensional Stability: ASTM D 2126	15% maximum total change	
	Surface Burning Characteristics: IBC—ASTM E 84 or UL 723 UBC Standard 8-1	75 flame-spread index or less; 450 smoke-developed index or less	
	Compressive Strength: ASTM D 1621	15 lb/in ² , minimum	
Roofing	Core Density: ASTM D 1622	2.5 - 3.0 lb/ft ³	
	Fensile Strength: ASTM D 1623	40 lb/in ² , minimum	
	Dimensional Stability: ASTM D 2126	15% maximum total change	
	Surface Burning Characteristics: ASTM E 84 or UL 723 UBC Standard 8-1	75 flame-spread index or less	
	Compressive Strength: ASTM D 1621	40 lb/in ² , minimum	
Sealant	Core Density: ASTM D 1622	0.5 - 1.0 lb/ft ³	
	Surface Burning Characteristics: IBC—ASTM E 84 or UL 723 UBC Standard 8-1	75 flame-spread index or less; 450 smoke-developed index or less	
	Adhesion: ASTM D 1623	5 lb/in ² , minimum	

For SI: 1 lb/ft³ = 16.02 kg/m³; 1 bf/in² = 6.89 kPa.

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOAM PLASTIC INSULATION

TABLE 21—TEMPERATURE PROFILE FOR TESTS

TIME (minutes)	TEMPERATURE (°F)
0:00	Ambient
1:00	Ambient
2:00	80
3:00	160
4:00	270
5:00	310
6:00	330
7:00	360
8:00	400
9:00	425
≥ 10:00	425

For SI: 1°C = (°F - 32) ⁵/₉.