

RB152-16

IRC: R316.5.14 (New).

Proposed Change as Submitted

Proponent : Avery Lindeman, Green Science Policy Institute, representing Green Science Policy Institute (avery@greensciencepolicy.org); Marjorie Smith, representing Siegel & Strain Architects (Msmith@siegelstrain.com); Tom Neltner, Environmental Defense Fund, representing Environmental Defense Fund (tneltner@edf.org); Veena Singla, representing Natural Resources Defense Council (vsingla@nrdc.org); Tom Lent, Healthy Building Network, representing Healthy Building Network (tlent@healthybuilding.net); Suzanne Drake, Perkins+Will, representing Perkins+Will (suzanne.drake@perkinswill.com); Vytenis Babrauskas (vytob@doctorfire.com); Donald Lucas, representing Lawrence Berkeley National Laboratory (d_lucas@lbl.gov); Tony Stefani, representing San Francisco Firefighters Cancer Prevention Foundation (stefanit@sbcglobal.net); Dennis Murphy, representing USGBC California (dennis@usgbc-california.org); Jen Jackson, representing TBD (cynthia.jackson@sfgov.org); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Andrea Traber, representing Integral Group (atraber@integralgroup.com); Martin Hammer, Martin Hammer, Architect, representing Martin Hammer, Architect (mfhammer@pacbell.net); Russ Pitkin, SERA Architects, representing SERA Architects, Inc (russsp@serapdx.com); Stacia Miller, International Living Future Institute, representing International Living Future Institute (advocacy@living-future.org); David Eisenberg, Development Center for Appropriate Technology, representing Development Center for Appropriate Technology; Jan Willemse, representing Zimmer Gunsul Frasca Architects LLP

2015 International Residential Code

Add new text as follows:

R316.5.14 Below grade use. Foam plastic insulation shall not be required to meet the flame spread index and smoke-developed index criteria of Section R316.3 and shall not be subject to oxygen index limits provided that it is marked for below grade use only and is installed in accordance with one of the following:

1. The insulation is located between a concrete slab on grade and its subgrade.
2. The insulation is separated from the building interior by a masonry or concrete wall or foundation. Such insulation installed vertically shall be not less than 6 inches (152 mm) below finished exterior grade. Where installed horizontally, it shall be protected in accordance with Section R403.3.2.

Reason: This proposal creates a new sub-section in R316.5 which enables the voluntary use of foam plastic insulation that is not subject to flame spread, smoke-developed, and oxygen index requirements in certain installations below grade. This proposed code section creates an option whereby foam plastic insulation without flame retardants can be safely used below grade; it does not mandate any alteration to current building practice. It maintains the same level of fire safety provided under the current code and increases consumer choice of insulation products for unexposed or buried applications.

Figures 1 and 2 depict examples of installations where the proposed code section could be applied. These include insulation between a concrete slab on grade and its subgrade and exterior insulation for basement and foundation walls and frost-protected shallow foundations.

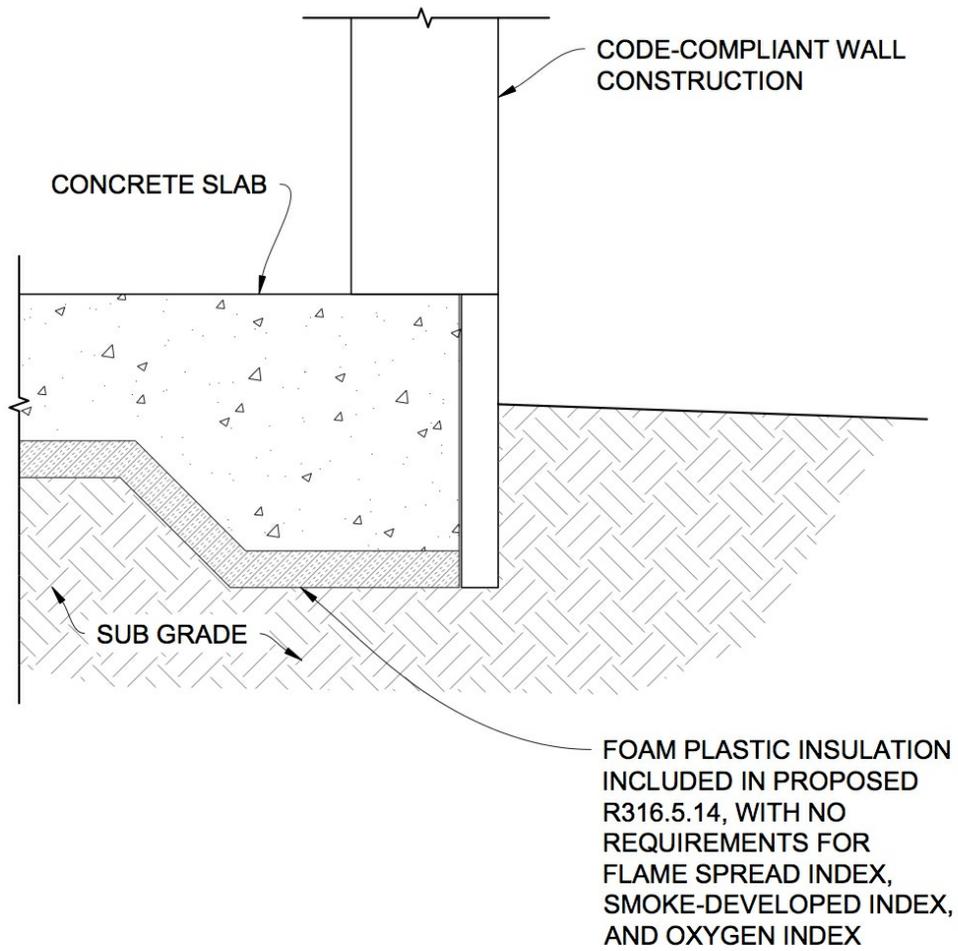


Figure 1: UNDER-SLAB BELOW-GRADE INSULATION
 Proposed Code Section R316.5.14

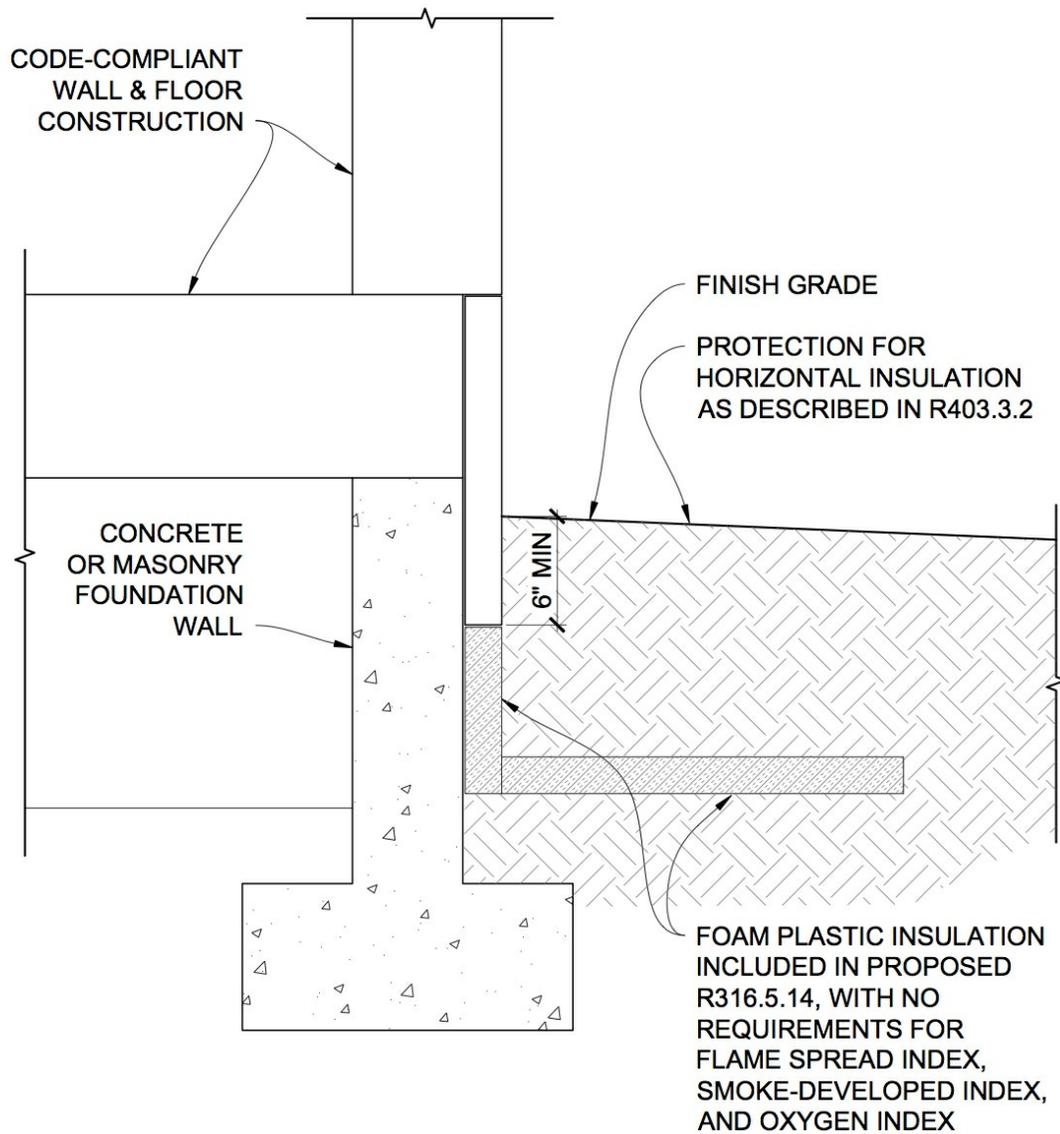


Figure 2: EXTERIOR BELOW-GRADE INSULATION
Proposed Code Section R316.5.14

The proposed code section maintains fire safety in the following ways:

- Insulation installed in accordance with this proposed code change is completely separated from the building interior.
- Insulation installed in accordance with this proposal has no exposure to a realistic source of ignition. It is protected either by a concrete slab having a minimum thickness of 3.5 inches (89 mm) as specified in IRC Section **R506 Concrete Floors (On Ground)**; or by a minimum of 6 inches of soil for exterior vertical insulation; or by a minimum of 12 inches of soil for horizontal exterior insulation unless additionally protected by concrete or asphalt as described in IRC Section **R403.3.2**

Protection of horizontal insulation below ground. These proposed protection requirements are based on existing code requirements for insulation protection and ensure that insulation covered by this proposal would not become exposed during the course of use. **Table 1** provides further details and references for proposed protection requirements.

- Insulation installed in accordance with this proposal does not have access to adequate oxygen to sustain a fire, as demonstrated by results from fire tests of below-grade foam plastic insulation. Fire testing is not regularly conducted on materials which are limited to buried applications only; however, the proponents conducted tests to address comments on similar proposals from the 2015 IBC-Fire Safety code committee that no fire test data had been submitted. These tests are described below.
 - **Description of Tests:** There is no established fire test method for the configurations covered by this proposed code section. The co-proponents are unaware of data on flame spread or smoke-developed between concrete and sub-grade material for foams of various material properties. Therefore, in response to requests for fire test data of relevant assemblies, Dr. David Rich at Reax Engineering Inc., and Dr. Donald Lucas (Lawrence Berkeley National Laboratory) and Avery Lindeman (Green Science Policy Institute), conducted tests to evaluate how different foam plastic insulation materials installed below grade would react when subjected to a range of fire spread scenarios. The insulation materials were sandwiched between concrete pavers (2 inches thick) and earth or other non-combustible surface. Tests were conducted with and without an externally applied radiant heat flux comparable to a post-flashover fire condition. Two types of insulation were tested: one that complied with the requirements of International Residential Code (IRC) Section **316.3 Surface burning characteristics**; and a similar below-grade insulation material that did not comply with Section 316.3 requirements. Ignition was achieved at an opening in the pavers to observe fire spread beneath the simulated concrete slab. This was necessary because when there were no openings between the pavers, neither sample of foam plastic insulation ignited, even at conditions where melting occurred. When there were significant openings (16 square inches) or gaps (2.5 inches) between the concrete pavers, and insulation was subjected to an open flame ignition source and an external heat flux, both samples ignited and burned comparably; however, without an external heat flux, ignition of insulation was followed by limited flame spread, and flames self-extinguished due to restricted access to oxygen as the flame burned away from the opening in the pavers.
- Insulation installed in accordance with this proposed code change is still subject to the labeling and identification requirements of Section **R316.2 Labeling and identification** which ensures that foam plastic insulation is labeled with the product identification and sufficient information to determine that the end use complies with code requirements. This proposal would additionally require that materials for use in the allowed below-grade applications be clearly labeled for below grade use only as specified in the proposed Section R316.5.14.

Table 1: Comparison of existing codes and standards with proposed provisions for insulation protection.

| Existing Code Section | Description of Protection Requirements | Relevance for Proposed Section R316.5.14 |
|-----------------------|---|--|
| IECC Section C303.2.1 | "Insulation applied to the exterior of basement walls, crawlspace walls and the perimeter of slab-on-grade floors shall have a rigid, opaque and weather-resistant protective covering to prevent the degradation of the insulation's thermal performance. The protective covering shall cover the exposed exterior insulation and extend a minimum of 6 inches (153 mm) below grade." | IECC Section C303.2.1 Protection of exposed foundation insulation and ASCE 32-01: Design and Construction of Frost Protected Shallow Foundations require that an "opaque and weather-resistant protective covering" for exterior foundation wall insulation extend at least 6 inches below exterior finished grade. This covering is intended to protect against ultraviolet radiation, physical damage, or other sources of deterioration. At depths greater than 6 inches, no protective covering is required. Thus, a minimum depth of 6 inches below finished exterior grade will ensure that exterior vertical insulation installed using this proposed code section remains protected throughout the course of use. |
| IRC Section R403.3.2 | "Horizontal insulation placed less than 12 inches (305 mm) below the ground surface or that portion of horizontal insulation extending outward more than 24 inches (610 mm) from the foundation edge shall be protected against damage by use of a concrete slab or asphalt paving on the ground surface directly above the insulation or by cementitious board, plywood rated for below-ground use, or other <i>approved</i> materials placed below ground, directly above the top surface of the insulation." | According to the 2015 IRC Code Commentary, " <i>this protection for the insulation prevents damage due to excavating (e.g., for landscaping purposes).</i> " Thus, the proposed protection of insulation as described in Section R403.3.2 Protection of horizontal insulation below ground is sufficient to ensure protection of the insulation throughout the course of use. |

Oxygen index is not currently limited in Chapter 3 of the IRC. However, testing to ASTM C578, which limits the permitted oxygen index of polystyrene insulation materials, is required by Section **R403.3 Frost-protected shallow foundations** for materials used below grade for the purpose of insulating footings against frost. In addition, the acceptance criteria for certain types of foam plastic insulation (AC12: Acceptance Criteria for Foam Plastic Insulation) require testing to ASTM C578. The purpose of this index is to measure the percent of oxygen in air needed to sustain combustion in a candle-like fire. As described

in the standard:

"The values obtained by the oxygen index test...do not necessarily indicate or describe the fire risk of the materials and are used in this specification primarily to distinguish between insulations formulated with flame retardants and those not so formulated." (ASTM C578-14)

Oxygen index is not indicative of actual fire performance or safety of these materials. In the below grade applications covered by this proposal, the oxygen index of insulation materials is irrelevant. The proposed code section therefore does not limit the permitted oxygen index for insulation installed as specified.

The proponents are aware of concerns that this proposed code change may increase the fire hazard of foam plastic insulation materials during the transportation, storage, and installation stages of the product lifecycle. It is important to note that foam plastics are currently manufactured, transported, stored, and used safely in large quantities without added flame retardants in many other applications. In addition, current practices will maintain fire safety throughout these stages as described below:

- **Transportation:** The U.S. Department of Transportation does regulate the transportation of foam plastics. Special safety measures are not required for the bulk shipment of foam plastics, including food-grade materials and other foam plastics with varying material properties. Approval of the proposed code section will not create a new transportation fire hazard or increase the transportation fire hazards for foam plastic insulation materials.
- **Storage and Installation:** As stated in a 2003 Technical Bulletin from the Alliance for the Polyurethanes Industry, "All organic foam insulations, regardless of whether they contain fire retardants, should be considered combustible and handled accordingly. Certain precautions must be taken to minimize any potential for fire through accidental ignition in handling, storage, and use." The surface burning characteristics required in Section R316.3 are not sufficient to provide fire safety. Approval of the proposed code section will not create new storage and installation fire hazards, and the following practices – which pertain to any combustible or flammable material, not just foam plastics – should be followed regardless of the flame spread index and smoke-developed index of insulation materials on the jobsite
 - In accordance with OSHA Regulations for Occupational Safety and Health and Construction, worksite storage of foam plastics and other flammable materials should be done safely and in a way that does not block exits. The Alliance for the Polyurethanes Industry recommends that foam boardstock be stored "in limited quantities, in an accessible location, and free from ignition hazards."
 - OSHA regulations also require that hot work adhere to NFPA 51B, which stipulates that activities like welding and cutting should only be performed when appropriate precautions are taken. These include removal or proper protection from sparks, heat, or hot metal of any flammable materials in the vicinity of the work.

The proposed code section is similar in scope to two code change proposals submitted during the 2015 Code Development Cycle (designated FS 170-15 and FS 171-15) that were disapproved by the 2015 IBC-Fire Safety code committee. The proponents have addressed that committee's reasons for disapproval as discussed below:

1. **Committee Reason for disapproval of FS 170-15 and FS 171-15:** Hazards can increase based on misuse of products on the jobsite and during storage and handling of the material to get it manufactured, stored, and delivered to the jobsite.
Response: This proposal explicitly requires insulation materials manufactured for use under the proposed code section to be labeled for below grade use only. This will enable inspectors and workers to identify foam plastic insulation materials for use with this code section and prevent the accidental installation or misuse of such materials in other, unapproved applications. Furthermore, as discussed above, existing specifications for the safe storage and handling of foam plastics do not differentiate between materials with and without flame retardant chemicals. Flame retardants used in foam plastic insulation may provide only a limited benefit against a narrow range of possible ignition sources. Once ignited, foam plastics with and without flame retardants behave similarly.
2. **Committee Reason for disapproval of FS 170-15 and FS 171-15:** No fire test data has been submitted on the product used in this application – fire can get below ground and protection by the slab or by masonry or concrete wall or foundation may not always be enough.
Response: This reason statement provides fire test data for the proposed applications. It is important to note that there is no established fire test method for insulation in the configurations covered by this proposed code section. There is also no fire loss history to indicate that these configurations pose a particular fire hazard. As stated in the code commentary for the 2015 IRC Section **R316.5.13 Floors**, "...in the event of an interior fire, the floor is typically the last building element to be significantly exposed by the fire." Nevertheless, fire tests were conducted and the results confirmed that protection of insulation by a concrete slab or by a masonry or concrete wall or foundation is more than sufficient to provide fire safety for inhabitants and first responders. The results further demonstrated that insulation installed as allowed by this proposed code section behaved comparably with and without added flame retardants, confirming that current levels of fire safety will be maintained.
3. **Committee Reason for disapproval of FS 170-15 and FS 171-15:** Proposed provision for insulation depth is arbitrary and may allow insulation to become exposed after occupancy, which could then increase flame spread to other portions of the exterior of the building

Response: This proposal provides references for the proposed insulation protection requirements. Depths below grade and additional protection requirements are based on existing standards for protection of below-grade insulation which have already been approved and incorporated into the IRC as adequate for protecting insulation throughout the course of use.

4. **Committee Reason for disapproval of FS 170-15 and FS 171-15:** Proponents raised a perceived toxicity problem with fire retardant-treated foam plastic but provided no data showing the health risks of fire retardant-treated products.

Response: This proposal does not ask the code committee to evaluate or to make a decision based on possible health risks of fire retardant-treated products. Rather, it describes specific installation conditions for below-grade foam plastic insulation where fire retardants are not needed to provide fire safety. Because there is no fire safety benefit from the use of flame retardants in insulation in these applications, the code should allow for a choice of insulation materials without flame retardants that can be used safely.

The proposed code section does not prohibit the use of foam plastic insulation that meets the requirements of Section R316.3, nor does it prohibit the use of foam plastic insulation that contains flame retardants. It does not mandate any change to current building practice. Instead, it describes specific applications below-grade where foam plastic insulation that does not contain flame retardants, and therefore does not meet the requirements of Section R316.3, can be safely used if desired. This proposed code section would maintain current levels of fire safety.

Cost Impact: Will not increase the cost of construction

The proposed code change will not require any action that increases construction costs since it does not mandate any change from current practice. Utilizing the proposed code change would be optional: it would not require any alteration to design or construction practices. The proposed change would enable voluntary manufacture and use of alternative foam plastic insulation products that do not contain flame retardant chemicals. The cost of using these alternative insulation products may be higher, lower, or the same as the cost of using currently available insulation depending on formulation costs, production volumes, consumer demand, and level of competition.

**RB152-16 :
R316.5.14 (NEW)-
LINDEMAN12127**

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: The committee is concerned that the lack of labeling requirements in the proposal and the reason statement creates a possibility that similar foam products could be mixed up in the field. Those working in the field need to be able to readily pick the right product for each application. In addition, testing by a third party accredited laboratory should be required. That said, the committee encourages the proponents to continue to develop these requirements.

Assembly Action:

None

Analysis: This code change proposal was initially placed on the ballot for an assembly motion. Upon further review, it was discovered that the motion did not receive a second. Therefore the proposal was removed from the ballot.

Individual Consideration Agenda

Public Comment 1:

Proponent : Avery Lindeman, Green Science Policy Institute, representing Green Science Policy Institute (avery@greensciencepolicy.org); David Eisenberg, DCAT, representing Development Center for Appropriate Technology; Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); Donald Lucas, Lawrence Berkeley National Laboratory (d_lucas@lbl.gov); Paul Wermer, representing self (paul@pw-sc.com); Vytenis Babrauskas, representing Fire Science and Technology Inc.; Veena Singla, representing Natural Resources Defense Council (vsingla@nrdc.org); Tom Lent, representing Healthy Building Network (tlent@healthybuilding.net); Jonathan Wilson (jwilson@nchh.org); Tom Neltner, Environmental Defense Fund (tneltner@edf.org); Suzanne Drake, representing Perkins+Will (suzanne.drake@perkinswill.com); Dennis Murphy, representing US Green Building Council California (dennis@usgbc-california.org); Russ Pitkin, representing SERA Architects, Inc. (russsp@serapdx.com); Jan Willemse, representing ZGF Architects LLP; Marjorie Smith, Siegel & Strain Architects, representing Siegel & Strain Architects (Msmith@siegelstrain.com); Tony Stefani, San Francisco Firefighters Cancer

Prevention Foundation, representing San Francisco Firefighters Cancer Prevention Foundation (stefanit@sbcglobal.net); Andrea Traber, representing Integral Group (atraber@integralgroup.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Residential Code

R316.5.14 Below grade use. Foam plastic insulation board for use below grade shall not be required to meet the flame spread index and smoke-developed index criteria of Section R316.3 and shall not be subject to oxygen index limits provided that it is marked for below grade use only and is installed in accordance with one all of the following are satisfied:

1. The insulation is located between a concrete slab on grade and its subgrade.
2. The insulation is separated from the building interior by a masonry or concrete wall or foundation. Such insulation installed vertically shall be not less than 6 inches (152 mm) below finished exterior grade. Where installed horizontally, it shall be protected in accordance with Section R403.3.2.
1. The insulation is tested in accordance with ASTM C578, ASTM C1289, ASTM C591, or other standard specification for physical properties of foam plastic insulation boards. Testing for flame spread, smoke-developed, and limiting oxygen indexes shall not be required.
2. In addition to the requirements of Section R316.2, the words "FOR BELOW-GRADE USE ONLY - Not Tested for Flame Spread Index or Smoke-Developed Index" shall be printed on both faces in red lettering not less than 1 inch (25 mm) in height, repeated continuously across the panel, with not more than 12 inches (305mm) between lines of text.
3. The insulation is installed in accordance with one of the following:
 - 3.1. The insulation is located between a concrete slab-on-grade and its subgrade,
 - 3.2. The insulation is installed horizontally, separated from the building interior by a masonry or concrete wall or foundation, and protected as described in Section R403.3.2, or
 - 3.3. The insulation is installed vertically not less than 6 inches (152 mm) below finished exterior grade and is separated from the building interior by a masonry or concrete wall or foundation.

Commenter's Reason: This Public Comment modifies the original proposal to address feedback from the 2016 IRC-Building Code Committee and stakeholders. If approved, it would maintain fire safety and increase consumer choice of insulation products for safe use below-grade. This proposal would not require any change to current building practice. It would instead enable voluntary manufacture and use of insulation without flame retardants in the specified below-grade applications.

While this modified proposal is similar in scope to previous proposals for the IRC and IBC that have been disapproved, the 2016 IRC-Building Code Committee encouraged the continued development of this proposal, as documented in the Report of the Committee Action Hearing. The proponents have addressed that committee's reasons for disapproval, as discussed below:

- **Committee Reason for disapproval of RB 152-16:** There is a lack of labeling requirements in the proposal, leading to the possibility that similar foam products could be mixed up in the field. Those working in the field need to be able to readily pick the right product for each application.v

Response: This Public Comment adds a new subsection to the proposal (R316.5.14.2) which explicitly requires insulation materials to be extensively labeled for below grade use only. The proposed labeling will make it easy for workers and inspectors to identify foam plastic insulation materials for use with this code section and therefore prevent the accidental installation or misuse of such materials in other (unapproved) applications. The proposed labeling will not conflict with other, existing labeling and identification requirements and practices for foam plastic insulation board.

- **Committee Reason for disapproval of RB 152-16:** Testing by a third-party accredited laboratory should be required.

Response: This Public Comment adds a new subsection to the proposal (R316.5.14.1) which requires that materials manufactured for use with this section be tested to existing standards for foam plastic insulation to characterize physical properties such as compressive strength, density, thermal resistance, water absorption, and others important for the specified below-grade applications. Materials already in use in these applications are routinely tested to these same standards as part of the Acceptance Criteria for Foam Plastic Insulation (AC12). Adding subsection R316.5.14.1 to this proposal clarifies the appropriate testing and characterization of foam plastic insulation materials for use with this code section, which in turn enables the safe and proper use of foam plastic insulation without flame retardants below grade.

This proposal maintains the existing expectations of appropriate labeling and listing. The language in IRC **R316.2 Identification and labeling**, together with the definition of "*listed and approved agency*" in Chapter 2 of the IRC, is unambiguous in requiring that the material be tested by an approved agency and found suitable for a specified purpose.

Testing for Flame Spread Index, Smoke-Developed Index, and Limiting Oxygen Index are not required for the applications covered in this proposal for the following reasons:

- There is no fire loss history to indicate that the configurations covered by this proposal pose a fire hazard. As stated in the code commentary for the 2015 IRC Section **R316.5.13 Floors**, "...in the event of an interior fire, the floor is typically the

last building element to be significantly exposed by the fire." Similarly, insulation installed below grade and separated from the building interior by a masonry or concrete wall or foundation poses no reasonable fire hazard.

- **IRC Section R316.6 Specific Approval** allows for the use of insulation that does not comply with the Flame Spread or Smoke-Developed Index requirements of R316.3 provided that it has been approved based on "fire tests related to actual end-use configurations." Because there is no fire loss history or reasonable expectation of a fire hazard for the configurations covered by this proposal, no accepted fire test methods exist for these end-use configurations. However, fire tests simulating these applications have been conducted, and the results confirm that protection of insulation by a concrete slab, masonry or concrete wall or foundation, or as specified by R403.3.2 provides sufficient fire safety for inhabitants and emergency responders. Furthermore, test results were comparable for insulation with and without flame retardants when installed as allowed by this proposal. Protocols and results of this testing are summarized in an accompanying document (Lindeman 2016).
- Oxygen index is not currently limited in Chapter 3 of the IRC. However, testing to ASTM C578 would be required for the applications outlined in proposed section R316.5.14.3 when this code section is voluntarily utilized. Testing to ASTM C578 is already required by Section **R403.3 Frost-protected shallow foundations** for materials used below grade for the purpose of insulating footings against frost – a possible application of this proposal. In addition, the acceptance criteria for certain types of foam plastic insulation (AC12: Acceptance Criteria for Foam Plastic Insulation) require testing to ASTM C578. ASTM C578 limits the permitted oxygen index of polystyrene insulation materials. The purpose of this index is to measure the percent of oxygen in air needed to sustain combustion in a candle-like fire. Oxygen index is not indicative of actual fire performance or safety of insulation materials. In the below grade applications covered by this proposal, the oxygen index of insulation materials is irrelevant. The proposed code section therefore does not limit the permitted oxygen index for insulation installed as specified, and this enables polystyrene insulation without flame retardants to be among the materials suitable for use in these applications. As described in the standard:

"The values obtained by the oxygen index test...do not necessarily indicate or describe the fire risk of the materials and are used in this specification primarily to distinguish between insulations formulated with flame retardants and those not so formulated." (ASTM C578-14)

Additional Considerations:

- Foam plastic insulation without added flame retardants is currently manufactured in Europe and approved for use in a number of applications including those covered by this proposal. Flame spread and smoke developed indexes can and have been measured for some of these materials. Flame spread index was measured at approximately 200, and smoke-developed index was measured in the range of approximately 700 – 850 (Lindeman 2016). To the commenters' knowledge, the availability and widespread use of such materials in Scandinavia has not resulted in an increase in fire incidents on the job site or throughout the product lifecycle.
- Opponents have commented that the availability of below-grade foam plastic insulation would significantly increase hazards during storage and transportation of these materials. However, foam plastic without added flame-retardants is used extensively in other applications in the U.S., such as for food-contact materials and cushioning for packaging. Our research found no evidence of unresolved safety issues pertaining to the storage and transportation of such materials.
 - **A significant portion of foam plastic polystyrene manufactured in the U.S. does not contain flame-retardants.** In June we contacted a number of different food service and other packaging companies about whether or not their products contained flame retardants. Seven companies responded that their foam polystyrene products do not contain flame retardants, including all of the food service packaging companies. We also screened samples of 14 different kinds of polystyrene foam packaging and food service products from eight different brands, none of which were found to contain flame retardants. This suggests that most – if not all – polystyrene foam food service and many packaging products in the U.S. do not contain flame retardant chemicals. In 2015, an estimated 1.3 billion pounds of extruded polystyrene (XPS) and expanded polystyrene (EPS) (40% of the North American polystyrene foam market) were manufactured for use as packaging and food service and based on our research were unlikely to contain flame-retardants (Forman 2015).
 - **Foam polystyrene without flame retardants is already considered safe to store and transport in large quantities.** We also contacted manufacturers who transport and store flame retardant-free foamed polystyrene products in large quantities (e.g., 25 million pound/year at a single facility). After manufacturing and conditioning to reduce concentrations of the blowing agent (e.g., pentane), the materials are not considered hazardous to transport. The U.S. Department of Transportation does not restrict shipping of such materials, and shipments from factories to regional distribution centers are done in fully loaded semi-trailer trucks. Other codes already include requirements for proper rack clearances and sizing of sprinkler systems for high-rack storage of foam plastics. The Fire Code covers appropriate storage of foam plastic insulation on-site and considers a wide range of combustible materials. The existing Fire Code requirements are sufficient even in the event that foam plastic insulation board without flame retardants is present on site.
- Proposed insulation protection requirements (including depths below grade) are based on existing standards for protection of below-grade insulation which have already been approved and incorporated into the IRC. These requirements are

considered adequate for protecting insulation throughout the course of use, and are described in detail in the original Reason Statement for RB152-16 submitted in January 2016. **Figures 1 and 2** depict examples of installations where the proposed code section could be applied. These include insulation between a concrete slab-on-grade and its subgrade and exterior insulation for basement and foundation walls and frost-protected shallow foundations.

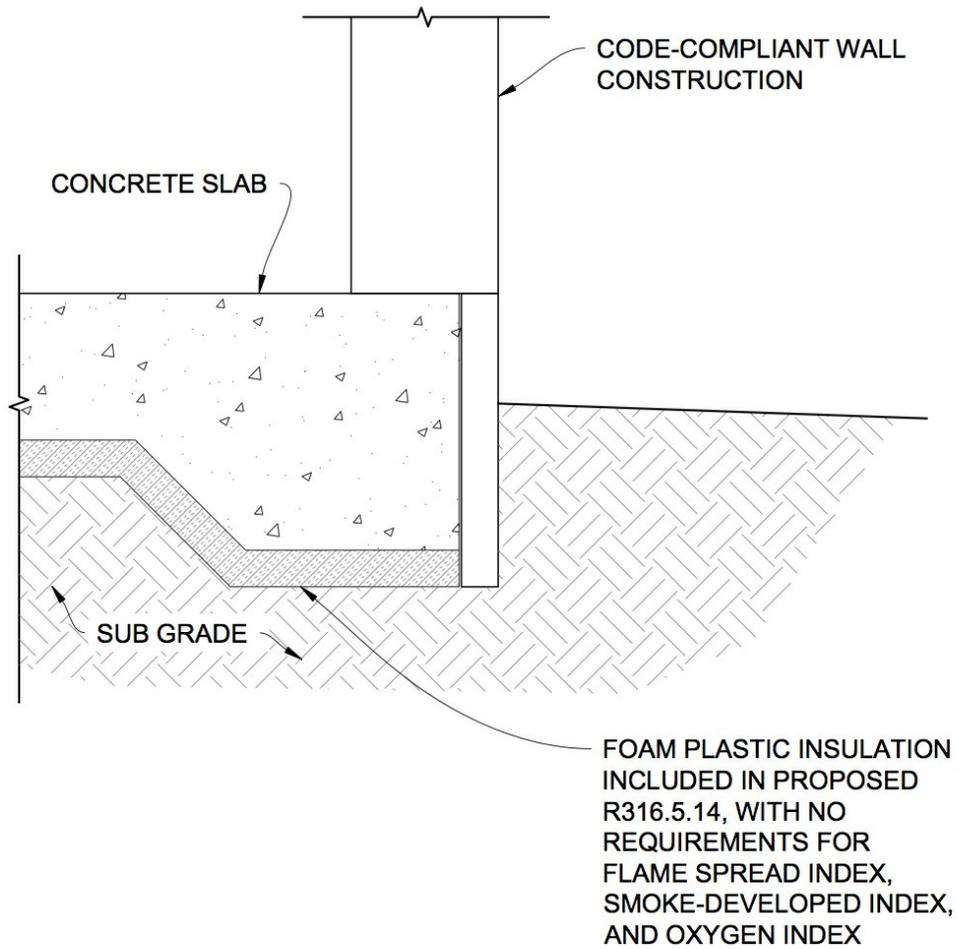


Figure 1: UNDER-SLAB BELOW-GRADE INSULATION
Proposed Code Section R316.5.14

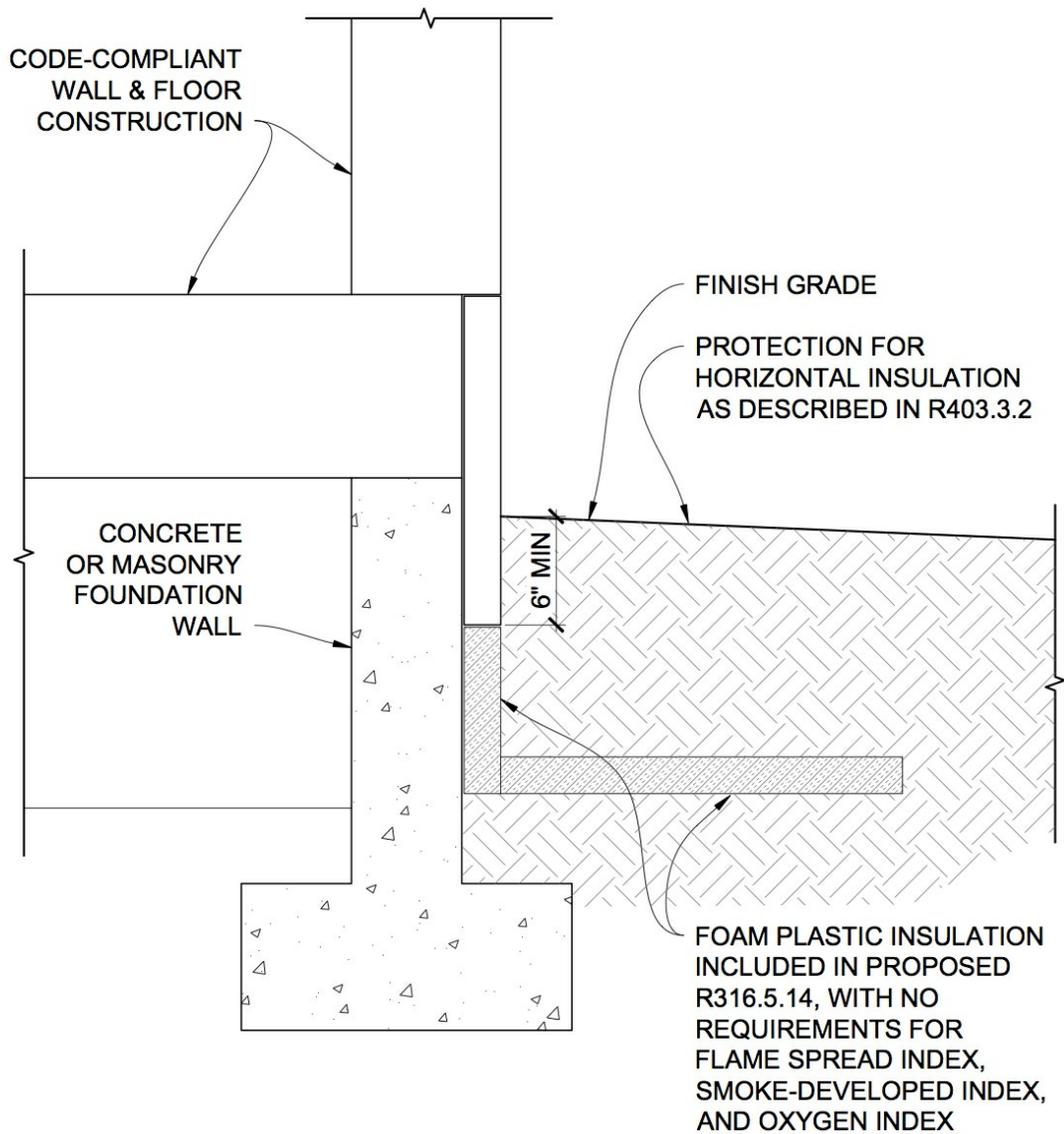


Figure 2: EXTERIOR BELOW-GRADE INSULATION
 Proposed Code Section R316.5.14

This proposal does not ask for an evaluation of possible health risks of fire retardant-treated products. Rather, it describes specific installation conditions for below-grade foam plastic insulation where fire retardants are not needed to provide fire safety. Because there is no fire safety benefit from the use of flame retardants in insulation in these applications, the code should allow for a choice of insulation materials without flame retardants.

This proposal further provides comprehensive testing and labeling requirements for below-grade insulation produced without flame retardants to ensure that such materials possess the necessary properties for below-grade use and that improper use can be easily identified and corrected or prevented in the field.

Bibliography: Lindeman A., Lucas D., and Rich D. (2016) *Can foam plastic insulation without flame retardants be used safely below grade?* Accessible at: http://saferinsulation.org/wp-content/uploads/2016/07/RB152-16_Public-Comment_White-Paper.pdf

Forman C. (2015) *Polymeric Foams*. BCC Research, Report Code PLS008H. Accessed through University of California Library.

Proponent : Jay West, representing American Chemistry Council requests Disapprove.

Commenter's Reason: The Energy Efficient Foam Coalition supports the results of the Committee Action Hearing to disapprove RB 152-16. The proposal would reduce fire safety during transportation, storage, and construction. As noted multiple times in testimony, there are significant concerns around the potential misuse of non-flame retarded insulation when both certified and non-flame retarded foam insulation products are on the same job site. In fact, proponents' schematics fail to differentiate clearly between foam insulation that would be exempt from the requirements of R316 and those that would not (see Figure A). Furthermore, the International Association of Building Officials testified that the proposal fails to provide sufficient information for code officials to conduct proper inspections. Finally, the fire demonstrations described by the proponents showed instances where the non-fire retarded foam ignited and the fire-retarded foam did not ignite, despite proponents' assurances that there is no fire safety issue in a below-grade scenario. The demonstrations were not conducted in an accredited, third-party testing environment and were not representative of the broad range of fire safety risks the proposal could introduce.

Figure A. Proponents' schematics do not clearly and unambiguously show where to use flame-retarded and non-flame retarded insulation. RB 152-16 mixes foam plastic insulation products that meet the basic 75 flame spread index/450 smoke developed index (shown vertically) with foam insulation products with UNLIMITED flame spread/smoke developed indices. Foam insulation in the locations noted by the arrows below MUST meet the 75/450 ASTM E84 requirements.

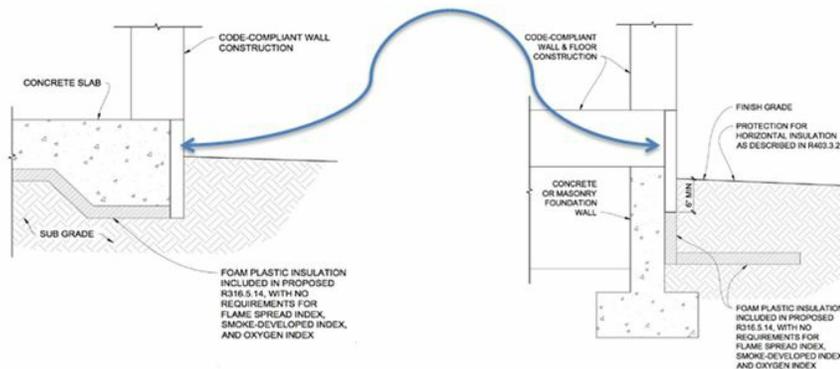


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