

2006 INTERNATIONAL ENERGY CONSERVATION CODE

Code Change No: **EC28-06/07**

Original Proposal

Sections: IECC: 202, 402.5, 402.5.1 (New), Table 402.5.1 (New), 402.5.2 (New), 402.5.3 (New), 402.2.8, 502.5, 502.5.1 (New), Table 502.5.1 (New), 502.5.2 (New), 502.5.3 (New)

IRC: 202, R318, R318.1, R408.3, R702.3.8, R806.2, N1102.2.8, N1102.5, N1102.5.1 (New), Table N1102.5.1 (New), N1102.5.2 (New), N1102.5.3 (New)

IBC: 202, 1203.2, 1203.3.2, 1403.2, 1910.1, 2509.3, 2510.6

IMC: 202

THIS PROPOSAL IS ON THE AGENDA OF THE IECC, IRC, IBC GENERAL, IBC FIRE SAFETY, IBC STRUCTURAL AND THE IRC BUILDING/ENERGY CODE DEVELOPMENT COMMITTEES. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

Proponent: Joseph Lstiburek, Building Science Corporation, representing himself

PART I – IECC

1. Delete and substitute as follows:

~~**VAPOR RETARDER.** A vapor resistant material, membrane or covering such as foil, plastic sheeting, or insulation facing having a permeance rating of 1 perm (5.7 X 10⁻¹¹ kg/Pa · E s⁻¹ · Em²) or less when tested in accordance with the desiccant method using Procedure A of ASTM E-96. Vapor retarders limit the amount of moisture vapor that passes through a material or wall assembly.~~

~~**VAPOR RETARDER CLASS.** A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class shall be defined using the desiccant method of ASTM E-96 as follows:~~

~~Class I: 0.1 perm or less~~

~~Class II: 0.1 < perm >= 1.0 perm~~

~~Class III: 1.0 < perm >= 10 perm~~

~~Class IV: Greater than 10 perm~~

~~**402.5 Moisture control. (Mandatory).** The building design shall not create conditions of accelerated deterioration from moisture condensation. Above-grade frame walls, floors and ceilings not ventilated to allow moisture to escape shall be provided with an approved vapor retarder. The vapor retarder shall be installed on the warm-in-winter side of the thermal insulation.~~

Exceptions:

- ~~1. In construction where moisture or its freezing will not damage the materials.~~
- ~~2. Frame walls, floors and ceilings in jurisdictions in Zones 1, 2, 3, 4A and 4B. (Crawl space floor vapor retarders are not exempted.)~~
- ~~3. Where other approved means to avoid condensation are provided.~~

~~**402.5 Vapor retarders.** Class I or II vapor retarders are required on the interior side of walls in Zones 5, 6, 7, 8 and Marine 4.~~

Exceptions:

1. Basement walls.
2. Below grade portion of any wall.
3. Construction where moisture or its freezing will not damage the materials.

2. Add new text as follows:

402.5.1 Class III vapor retarders. Class III vapor retarders shall be permitted where the conditions in Table 402.5.1 are met.

**TABLE 402.5.1
CLASS III VAPOR RETARDERS**

<u>Zone</u>	<u>Class III vapor retarders permitted for:</u>
<u>Marine 4</u>	<u>Vented cladding over OSB</u> <u>Vented cladding over Plywood</u> <u>Vented cladding over Fiberboard</u> <u>Vented cladding over Gypsum</u> <u>Insulated sheathing with R-value \geq 2.5 in 2x4 wall</u> <u>Insulated sheathing with R-value \geq 3.75 in 2x6 wall</u>
<u>5</u>	<u>Vented cladding over OSB</u> <u>Vented cladding over Plywood</u> <u>Vented cladding over Fiberboard</u> <u>Vented cladding over Gypsum</u> <u>Insulated sheathing with R-value \geq 5 in 2x4 wall</u> <u>Insulated sheathing with R-value \geq 7.5 in 2x6 wall</u>
<u>6</u>	<u>Vented cladding over Fiberboard</u> <u>Vented cladding over Gypsum</u> <u>Insulated sheathing with R-value \geq 7.5 in 2x4 wall</u> <u>Insulated sheathing with R-value \geq 11.25 in 2x6 wall</u>
<u>7 and 8</u>	<u>Insulated sheathing with R-value \geq 10 in 2x4 wall</u> <u>Insulated sheathing with R-value \geq 15 in 2x6 wall</u>

402.5.2 Material vapor retarder class. The vapor retarder class shall be based on the manufacturer's certified testing or a tested assembly.

The following shall be deemed to meet the class specified:

- Class I: Sheet polyethylene, non-perforated aluminum foil
- Class II: Kraft faced fiberglass batts
- Class III: Latex paint
- Class IV: House wrap, building paper.

402.5.3 Minimum clear air spaces and vented openings. For the purposes of this section vented shall include the following minimum clear air spaces. Other openings with the equivalent net free area shall be permitted.

1. Stucco with a 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at the top and bottom of each wall.
2. Brick with a 2 inch clear airspace behind the brick with vents at both the top and bottom of the brick. The vents shall be 3/8 inch x 2.5 inch openings every third brick at both the bottom and top course of each wall.
3. Stone or Masonry Veneer with a 2 inch clear airspace behind the stone with vents at the top and bottom. The vents shall have at least 1 square inch of vent area for every 24 inches of wall.
4. Panel Siding with 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at both the top and bottom of each wall.
5. Wood, Wood Based, or Fiber Cement Siding with either a 1/4 inch clear airspace; or alternatively a 1/4 inch gap between the horizontal siding laps
6. Other approved clear air spaces and vented openings.

3. Revise as follows:

402.2.8 Crawl space walls. As an alternative to insulating floors over crawl spaces, crawl space walls shall be permitted to be insulated when the crawl space is not vented to the outside. Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finished grade level and then vertically and/or horizontally for at least an additional 24 inches (610 mm). Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder. All joints of the vapor retarder shall overlap by 6 inches (153 mm) and be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches (153 mm) up the stem wall and shall be attached to the stem wall.

4. Delete and substitute as follows:

~~**502.5 Moisture control. (Mandatory).** All framed walls, floors and ceilings not ventilated to allow moisture to escape shall be provided with an approved vapor retarder having a permeance rating of 1 perm (5.7×10^{-11} kg/Pa-s-m²) or less, when tested in accordance with the desiccant method using Procedure A of ASTM E 96. The vapor retarder shall be installed on the warm-in-winter side of the insulation.~~

Exceptions:

- ~~1. Buildings located in Climate Zones 1 through 3 as indicated in Figure 301.1 and Table 301.1.~~
- ~~2. In construction where moisture or its freezing will not damage the materials.~~
- ~~3. Where other approved means to avoid condensation in unventilated framed wall, floor, roof and ceiling cavities are provided.~~

502.5 Vapor retarders. Class I or II vapor retarders are required on the interior side of walls in zones 5, 6, 7, 8 and Marine 4.

Exceptions:

1. Basement walls.
2. Below grade portion of any wall.
3. Construction where moisture or its freezing will not damage the materials.

5. Add new text as follows:

502.5.1 Class III vapor retarders. Class III vapor retarders shall be permitted where the conditions in Table 502.5.1 are met.

**TABLE 502.5.1
CLASS III VAPOR RETARDERS**

<u>Zone</u>	<u>Class III vapor retarders permitted for:</u>
<u>Marine 4</u>	<u>Vented cladding over OSB</u> <u>Vented cladding over Plywood</u> <u>Vented cladding over Fiberboard</u> <u>Vented cladding over Gypsum</u> <u>Insulated sheathing with R-value \geq 2.5 in 2x4 wall</u> <u>Insulated sheathing with R-value \geq 3.75 in 2x6 wall</u>
<u>5</u>	<u>Vented cladding over OSB</u> <u>Vented cladding over Plywood</u> <u>Vented cladding over Fiberboard</u> <u>Vented cladding over Gypsum</u> <u>Insulated sheathing with R-value \geq 5 in 2x4 wall</u> <u>Insulated sheathing with R-value \geq 7.5 in 2x6 wall</u>
<u>6</u>	<u>Vented cladding over Fiberboard</u> <u>Vented cladding over Gypsum</u> <u>Insulated sheathing with R-value \geq 7.5 in 2x4 wall</u> <u>Insulated sheathing with R-value \geq 11.25 in 2x6 wall</u>
<u>7 and 8</u>	<u>Insulated sheathing with R-value \geq 10 in 2x4 wall</u> <u>Insulated sheathing with R-value \geq 15 in 2x6 wall</u>

502.5.2 Material vapor retarder class. The vapor retarder class shall be based on the manufacturer's testing or a tested assembly.

The following shall be deemed to meet the class specified:

Class I: Sheet polyethylene, non-perforated aluminum foil

Class II: Kraft faced fiberglass batts

Class III: Latex paint

Class IV: House wrap, building paper.

502.5.3 Minimum clear air spaces and vented openings. For the purposes of this section vented shall include the following minimum clear air spaces. Other openings with the equivalent net free area shall be permitted.

1. Stucco with a 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at the top and bottom of each wall.
2. Brick with a 2 inch clear airspace behind the brick with vents at both the top and bottom of the brick. The vents shall be 3/8 inch x 2.5 inch openings every third brick at both the bottom and top course of each wall.
3. Stone or Masonry Veneer with a 2 inch clear airspace behind the stone with vents at the top and bottom. The vents shall have at least 1 square inch of vent area for every 24 inches of wall.
4. Panel Siding with 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at both the top and bottom of each wall.
5. Wood, Wood Based, or Fiber Cement Siding with either a 1/4 inch clear airspace; or alternatively a 1/4 inch gap between the horizontal siding laps.
6. Other approved clear air spaces and vented openings.

PART II – IRC

1. Revise as follows:

SECTION R202 GENERAL DEFINITIONS

UNUSUALLY TIGHT CONSTRUCTION. Construction in which:

- Walls and ceilings comprising the building thermal envelope have a continuous ~~water~~ Class I or II vapor retarder ~~with a rating of 1 perm (5.7 x E10-11 kg/Pa · E s · E m²) or less~~ with openings therein gasketed or sealed.
- Storm windows or weatherstripping is applied around the threshold and jambs of opaque doors and openable windows.
- Caulking or sealants are applied to areas such as joints around window and door frames between sole plates and floors, between wall-ceiling joints, between wall panels, at penetrations for plumbing, electrical and gas lines, and at other openings.

2. Delete and substitute as follows:

~~**VAPOR RETARDER.** A vapor resistant material, membrane or covering such as foil, plastic sheeting, or insulation facing having a permeance rating of 1 perm (5.7 X 10-11 kg/Pa · E s · Em2) or less when tested in accordance with the dessicant method using Procedure A of ASTM E 96. Vapor retarders limit the amount of moisture vapor that passes through a material or wall assembly.~~

~~**VAPOR RETARDER CLASS.** A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class shall be defined using the desiccant method of ASTM E-96 as follows:~~

~~Class I: 0.1 perm or less~~

~~Class II: 0.1 < perm >= 1.0 perm~~

~~Class III: 1.0 < perm >= 10 perm~~

~~Class IV: Greater than 10 perm~~

3. Delete without substitution:

SECTION R318 MOISTURE VAPOR RETARDERS

~~**R318.1 Moisture control.** In all framed walls, floors and roof/ceilings comprising elements of the building thermal envelope, a vapor retarder shall be installed on the warm-in-winter side of the insulation.~~

Exceptions:

- ~~1. In construction where moisture or freezing will not damage the materials.~~
- ~~2. Where the framed cavity or space is ventilated to allow moisture to escape.~~
- ~~3. In counties identified as in climate zones 1 through 4 in Table N1101.2.~~

(Renumber subsequent sections)

4. Revise as follows:

R408.3 Unvented crawl space. Ventilation openings in under-floor spaces specified in Sections R408.1 and R408.2 shall not be required where:

1. Exposed earth is covered with a continuous Class I vapor retarder. Joints of the vapor retarder shall overlap by 6 inches (152 mm) and shall be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches (152 mm) up the stem wall and shall be attached and sealed to the stem wall; and

R702.3.8 Water-resistant gypsum backing board. Gypsum board used as the base or backer for adhesive application of ceramic tile or other required nonabsorbent finish material shall conform to ASTM C 630 or C 1178. Use of water-resistant gypsum backing board shall be permitted on ceilings where framing spacing does not exceed 12 inches (305 mm) on center for 1/2-inch-thick (13 mm) or 16 inches (406 mm) for 5/8-inch-thick (16 mm) gypsum board. Water-resistant gypsum board shall not be installed over a Class I or II vapor retarder in a shower or tub compartment. Cut or exposed edges, including those at wall intersections, shall be sealed as recommended by the manufacturer.

R806.2 Minimum area. The total net free ventilating area shall not be less than 1/150 of the area of the space ventilated except that reduction of the total area to 1/300 is permitted, provided that at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents. As an alternative, the net free cross-ventilation area may be reduced to 1/300 when a Class I or II vapor barrier having a transmission rate not exceeding 1 perm ($5.7 \times 10^{-11} \text{ kg/Pa} \cdot \text{s} \cdot \text{m}^2$) is installed on the warm-in-winter side of the ceiling.

N1102.2.8 Crawl space walls. As an alternative to insulating floors over crawl spaces, crawl space walls shall be permitted to be insulated when the crawl space is not vented to the outside. Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finished grade level and then vertically and/or horizontally for at least an additional 24 inches (610 mm). Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder. All joints of the vapor retarder shall overlap by 6 inches (153 mm) and be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches (153 mm) up the stem wall and shall be attached to the stem wall.

5. Delete and substitute as follows:

~~**N1102.5 Moisture control.** The building design shall not create conditions of accelerated deterioration from moisture condensation. Above-grade frame walls, floors and ceilings not ventilated to allow moisture to escape shall be provided with an approved vapor retarder. The vapor retarder shall be installed on the warm-in-winter side of the thermal insulation.~~

Exceptions:

- ~~1. In construction where moisture or its freezing will not damage the materials.~~
- ~~2. Frame walls, floors and ceilings in jurisdictions in Zones 1, 2, 3, 4A, and 4B. (Crawl space floor vapor retarders are not exempted.)~~
- ~~3. Where other approved means to avoid condensation are provided.~~

N1102.5 Vapor retarders. Class I or II vapor retarders are required on the interior side of walls in zones 5, 6, 7, 8 and Marine 4.

Exceptions:

1. Basement walls.
2. Below grade portion of any wall.
3. Construction where moisture or its freezing will not damage the materials.

6. Add new text as follows:

N1102.5.1 Class III vapor retarders. Class III vapor retarders shall be permitted where the conditions in Table N1102.5.1 are met.

**TABLE N1102.5.1
CLASS III VAPOR RETARDERS**

<u>Zone</u>	<u>Class III vapor retarders permitted for:</u>
<u>Marine 4</u>	<u>Vented cladding over OSB</u> <u>Vented cladding over Plywood</u> <u>Vented cladding over Fiberboard</u> <u>Vented cladding over Gypsum</u> <u>Insulated sheathing with R-value \geq 2.5 in 2x4 wall</u> <u>Insulated sheathing with R-value \geq 3.75 in 2x6 wall</u>
<u>5</u>	<u>Vented cladding over OSB</u> <u>Vented cladding over Plywood</u> <u>Vented cladding over Fiberboard</u> <u>Vented cladding over Gypsum</u> <u>Insulated sheathing with R-value \geq 5 in 2x4 wall</u> <u>Insulated sheathing with R-value \geq 7.5 in 2x6 wall</u>
<u>6</u>	<u>Vented cladding over Fiberboard</u> <u>Vented cladding over Gypsum</u> <u>Insulated sheathing with R-value \geq 7.5 in 2x4 wall</u> <u>Insulated sheathing with R-value \geq 11.25 in 2x6 wall</u>
<u>7 and 8</u>	<u>Insulated sheathing with R-value \geq 10 in 2x4 wall</u> <u>Insulated sheathing with R-value \geq 15 in 2x6 wall</u>

N1102.5.2 Material vapor retarder class. The vapor retarder class shall be based on the manufacturer’s testing or a tested assembly.

The following shall be deemed to meet the class specified:

- Class I: Sheet polyethylene, non-perforated aluminum foil
- Class II: Kraft faced fiberglass batts
- Class III: Latex paint
- Class IV: House wrap, building paper.

N1102.5.3 Minimum clear air spaces and vented openings. For the purposes of this section vented shall include the following minimum clear air spaces. Other openings with the equivalent net free area shall be permitted.

1. Stucco with a 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at the top and bottom of each wall.
2. Brick with a 2 inch clear airspace behind the brick with vents at both the top and bottom of the brick. The vents shall be 3/8 inch x 2.5 inch openings every third brick at both the bottom and top course of each wall.
3. Stone or Masonry Veneer with a 2 inch clear airspace behind the stone with vents at the top and bottom. The vents shall have at least 1 square inch of vent area for every 24 inches of wall.
4. Panel Siding with 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at both the top and bottom of each wall.
5. Wood, Wood Based, or Fiber Cement Siding with either a 1/4 inch clear airspace; or alternatively a 1/4 inch gap between the horizontal siding laps.
6. Other approved clear air spaces and vented openings.

PART III – IBC GENERAL

1. Delete and substitute as follows:

SECTION 202
GENERAL DEFINITIONS

VAPOR RETARDER. A vapor resistant material, membrane or covering such as foil, plastic sheeting, or insulation facing having a permeance rating of 1 perm ($5.7 \times 10^{-11} \text{ kg/Pa} \cdot \text{E} \cdot \text{s}^{-1} \cdot \text{m}^2$) or less when tested in accordance with the desiccant method using Procedure A of ASTM E 96. Vapor retarders limit the amount of moisture vapor that passes through a material or wall assembly.

VAPOR RETARDER CLASS. A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class shall be defined using the desiccant method of ASTM E-96 as follows:

Class I: 0.1 perm or less

Class II: $0.1 < \text{perm} \leq 1.0$ perm

Class III: $1.0 < \text{perm} \leq 10$ perm

Class IV: Greater than 10 perm

2. Revise as follows:

1203.2 Attic spaces. Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. A minimum of 1 inch (25 mm) of airspace shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than 1/150 of the area of the space ventilated, with 50 percent of the required ventilating area provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents.

Exception: The minimum required net free ventilating area shall be 1/300 of the area of the space ventilated, provided a vapor retarder having a transmission rate not exceeding 1 perm in accordance with ASTM E 96 is installed on the warm side of the attic insulation and provided 50 percent of the required ventilating area provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above eave or cornice vents, with the balance of the required ventilation provided by eave or cornice vents.

1203.3.2 Exceptions. The following are exceptions to Sections 1203.3 and 1203.3.1:

1. Where warranted by climatic conditions, ventilation openings to the outdoors are not required if ventilation openings to the interior are provided.
2. The total area of ventilation openings is permitted to be reduced to 1/1,500 of the under-floor area where the ground surface is ~~treated~~ covered with an ~~approved~~ a Class I vapor retarder material and the required openings are placed so as to provide cross ventilation of the space. The installation of operable louvers shall not be prohibited.
3. Ventilation openings are not required where continuously operated mechanical ventilation is provided at a rate of 1.0 cubic foot per minute (cfm) for each 50 floor area and the ground surface is covered with an ~~approved~~ a Class I vapor retarder.
4. Ventilation openings are not required when the ground surface is covered with an ~~approved~~ a Class I vapor retarder, the perimeter walls are insulated and the space is conditioned in accordance with the *International Energy Conservation Code*.
5. For buildings in flood hazard areas as established in Section 1612.3, the openings for under-floor ventilation shall be deemed as meeting the flood opening requirements of ASCE 24 provided that the ventilation openings are designed and installed in accordance with ASCE 24.

PART IV – IBC FIRE SAFETY

1403.2 Weather protection. Exterior walls shall provide the building with a weather-resistant exterior wall envelope. The exterior wall envelope shall include flashing, as described in Section 1405.3. The exterior wall envelope shall be designed and constructed in such a manner as to prevent the accumulation of water within the wall assembly by

providing a water-resistive barrier behind the exterior veneer, as described in Section 1404.2, and a means for draining water that enters the assembly to the exterior. ~~Protection against condensation in the exterior wall assembly shall be provided in accordance with the *International Energy Conservation Code*.~~

Exceptions:

1. A weather-resistant exterior wall envelope shall not be required over concrete or masonry walls designed in accordance with Chapters 19 and 21, respectively.
2. Compliance with the requirements for a means of drainage, and the requirements of Sections 1404.2 and 1405.3, shall not be required for an exterior wall envelope that has been demonstrated through testing to resist wind-driven rain, including joints, penetrations and intersections with dissimilar materials, in accordance with ASTM E 331 under the following conditions:
 - 2.1. Exterior wall envelope test assemblies shall include at least one opening, one control joint, one wall/eave interface and one wall sill. All tested openings and penetrations shall be representative of the intended end-use configuration.
 - 2.2. Exterior wall envelope test assemblies shall be at least 4 feet by 8 feet (1219 mm by 2438 mm) in size.
 - 2.3. Exterior wall envelope assemblies shall be tested at a minimum differential pressure of 6.24 pounds per square foot (psf) (0.297 kN/m²).
 - 2.4. Exterior wall envelope assemblies shall be subjected to a minimum test exposure duration of 2 hours.

The exterior wall envelope design shall be considered to resist wind-driven rain where the results of testing indicate that water did not penetrate control joints in the exterior wall envelope, joints at the perimeter of openings or intersections of terminations with dissimilar materials.

PART V – IBC STRUCTURAL

1910.1 General. The thickness of concrete floor slabs supported directly on the ground shall not be less than 31/2 inches (89 mm). A 6-mil (0.006 inch; 0.15 mm) polyethylene Class I vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the base course or subgrade and the concrete floor slab, or other approved equivalent methods or materials shall be used to retard vapor transmission through the floor slab.

Exception: A No vapor retarder is ~~not~~ required:

1. For detached structures accessory to occupancies in Group R-3, such as garages, utility buildings or other unheated facilities.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m²) and carports attached to occupancies in Group R-3.
3. For buildings of other occupancies where migration of moisture through the slab from below will not be detrimental to the intended occupancy of the building.
4. For driveways, walks, patios and other flatwork which will not be enclosed at a later date.
5. Where approved based on local site conditions.

2509.3 Limitations. Water-resistant gypsum backing board shall not be used in the following locations:

1. Over a Class I or II vapor retarder in shower or bathtub compartments.
2. Where there will be direct exposure to water or in areas subject to continuous high humidity.
3. On ceilings where frame spacing exceeds 12 inches (305 mm) o.c. for 1/2-inch-thick (12.7 mm) water-resistant

2510.6 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section 1404.2 and, where applied over wood-based sheathing, shall include a water-resistive Class III or IV vapor ~~permeable barrier~~ retarder with a performance at least equivalent to two layers of Grade D paper.

Exception: Where the water-resistive barrier that is applied over wood-based sheathing has a water resistance equal to or greater than that of 60-minute Grade D paper and is separated from the stucco by an intervening, substantially nonwater-absorbing layer or drainage space.

PART VI – IMC**1. Revise as follows:****SECTION 202
GENERAL DEFINITIONS****UNUSUALLY TIGHT CONSTRUCTION.** Construction in which:

1. Walls and ceilings comprising the building thermal envelope have a continuous ~~water~~ Class I or II vapor retarder ~~with a rating of 1 perm ($5.7 \times 10^{-11} \text{ kg/Pa} \cdot \text{s} \cdot \text{m}^2$) or less~~ with openings therein gasketed or sealed.
2. Storm windows or weatherstripping is applied around the threshold and jambs of opaque doors and openable windows.
3. Caulking or sealants are applied to areas such as joints around window and door frames between sole plates and floors, between wall-ceiling joints, between wall panels, at penetrations for plumbing, electrical and gas lines, and at other openings.

Reason: Wall assemblies can be designed and constructed to dry inwards, outwards and to both sides in all climate zones. Requiring vapor barriers and vapor retarders to always be installed on the interior of wall assemblies inhibits the use of wall designs that promote inward drying thereby increasing the risk of mold and moisture damage. This code change allows more flexibility in the design and construction of moisture forgiving wall systems.

These requirements for vapor retarder have been in the development process for at least 4 years. That process has included two Building America meetings, coordination with personnel at the Oakridge National Laboratory and the University of Waterloo, presentations before ASHRAE committees, and interactions with private companies.

These requirements recognize that many common materials function to various degrees to slow the passage of moisture. In many situations common materials such as the kraft facing on a fiberglass batt, or latex paint may serve to retard moisture sufficiently. In particular, the “standard” sheet of polyethylene is usually not required as a vapor retarder in walls.

This change includes modification of existing vapor retarder requirements and instances in the code to use the vapor retarder classes proposed here.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Note: The following analysis was not in the Code Change Proposal book but was published in the AErrata to the 2006/2007 Proposed Changes to the International Codes and Analysis of Proposed Reference Standards® provided at the code development hearings:

Analysis: Review of proposed new standard indicated that, in the opinion of ICC Staff, the standard did not comply with ICC standards criteria.

PART I C IECC**Committee Action:****Approved as Modified****Modify the proposal as follows:**

VAPOR RETARDER CLASS. A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class shall be defined using the desiccant method with Procedure A of ASTM E-96 as follows:

- Class I: 0.1 perm or less
- Class II: $0.1 < \text{perm} \leq 1.0$ perm
- Class III: $1.0 < \text{perm} \leq 10$ perm
- ~~Class IV: Greater than 10 perm~~

402.5 Vapor retarders. Class I or II vapor retarders are required on the interior side of frame walls in zones 5, 6, 7, 8 and Marine 4.

Exceptions:

1. Basement walls.
2. Below grade portion of any wall.
3. Construction where moisture or its freezing will not damage the materials.

402.5.2 Material vapor retarder class. The vapor retarder class shall be based on the manufacturer's certified testing or a tested assembly. The following shall be deemed to meet the class specified:

- Class I: Sheet polyethylene, non-perforated aluminum foil
- Class II: Kraft faced fiberglass batts
- Class III: Latex paint
- ~~Class IV: House wrap, building paper.~~

CODE CHANGES RESOURCE COLLECTION – INTERNATIONAL BUILDING CODE

402.5.3 Minimum clear air spaces and vented openings for vented cladding. For the purposes of this section vented cladding shall include the following minimum clear air spaces. Other openings with the equivalent ~~net free~~ vent area shall be permitted.

1. Stucco with a 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at the top and bottom of each wall.
 2. Brick with a 2 inch clear airspace behind the brick with vents at both the top and bottom of the brick. The vents shall be 3/8 inch x 2.5 inch openings every third brick at both the bottom and top course of each wall.
 3. Stone or Masonry Veneer with a 2 inch clear airspace behind the stone with vents at the top and bottom. The vents shall have at least 1 square inch of vent area for every 24 inches of wall.
 4. Panel Siding with 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at both the top and bottom of each wall.
 5. Wood, Wood Based, or Fiber Cement Siding with either a 1/4 inch clear airspace; or alternatively a 1/4 inch gap between the horizontal siding laps
 6. Vinyl lap siding applied directly to a weather resistive barrier.
 7. Manufactured Stone Veneer with a 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at both the top and bottom of each wall.
6. 8. Other approved clear air spaces and vented openings.

(Portions of proposal not shown remain unchanged)

Committee Reason: The proposed change introduces advances in technology related to vapor retarders, and provides for more flexibility in exterior wall design. The proposal moves the code forward from the Aone size fits all® approach that is presently in the code, while at the same time not eliminating any construction that was previously done using the present code. The modification eliminates reference to Class IV, as it is not used in the I-codes anywhere. In addition, the modification adds exceptions regarding clear air space that enable construction of common applications without change to the standard methods for installing vinyl siding and manufactured stone veneer.

Assembly Action:

None

PART II C IRC

Committee Action:

Disapproved

Committee Reason: The proposed new text, Section N1102.5.3, is confusing, unclear and belongs in the wall covering chapter. The committee likes this concept and this is needed in the code. However, this is a much larger problem and this proposal does not fully solve it. The proponent should work with industry and more research and development is needed in order to find the proper solution.

Assembly Action:

None

PART III C IBC GENERAL

Committee Action:

Disapproved

Committee Reason: The committee disapproved the proposal primarily because as proposed the provisions requiring net free ventilating area of not less than 1/150 would never apply. Committee members support deleting the exception in its entirety and revising the main section to use 1/300 instead of 1/150. It should also be noted that the committee felt the proponents proposed modification to the new definition of VAPOR RETARDER CLASS to delete Class IV was appropriate.

Assembly Action:

None

PART IV C IBC FIRE SAFETY

Committee Action:

Disapproved

Committee Reason: The committee preferred the approach of FS171-06/07. Instead of simply deleting the reference, the committee preferred to have the provisions brought into the code. That approach will help to provide the requirements within the code so that they are known. See committee reason statement for FS171-06/07.

Assembly Action:

None

PART V C IBC STRUCTURAL

Committee Action:

Disapproved

Committee Reason: There was some concern with maintaining the integrity of the vapor retarder under concrete slabs on grade. Also it was unclear whether the 6-mil polyethylene vapor retarder is in fact a class 1 vapor retarder as this proposal would require. Most of this information belongs in the commentary rather than the code.

Assembly Action:

None

PART VI C IMC

Committee Action:

Disapproved

Committee Reason: The definition proposed to be revised was deleted by the action taken on M108-06/07.

Assembly Action:

None

Public Comments

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted for Part I (IECC).

Public Comment 2:

Joseph Lstiburek, Building Science Corporation, representing himself, requests Approval as Modified by this Public Comment for Part I.

Further modify proposal as follows:

402.5.1 Class III vapor retarders. Class III vapor retarders shall be permitted where any one of the conditions in Table 402.5.1 are met.

**TABLE 402.5.1
CLASS III VAPOR RETARDERS**

Zone	Class III vapor retarders permitted for:
Marine 4	Vented cladding over OSB Vented cladding over Plywood Vented cladding over Fiberboard Vented cladding over Gypsum Insulated sheathing with R-value \geq <u>R2.5 in-over</u> 2x4 wall Insulated sheathing with R-value \geq <u>R3.75 in-over</u> 2x6 wall
5	Vented cladding over OSB Vented cladding over Plywood Vented cladding over Fiberboard Vented cladding over Gypsum Insulated sheathing with R-value \geq <u>R5 in-over</u> 2x4 wall Insulated sheathing with R-value \geq <u>R7.5 in-over</u> 2x6 wall
6	Vented cladding over Fiberboard Vented cladding over Gypsum Insulated sheathing with R-value \geq <u>R7.5 in-over</u> 2x4 wall Insulated sheathing with R-value \geq <u>R11.25 in-over</u> 2x6 wall
7 and 8	Insulated sheathing with R-value \geq <u>R10 in-over</u> 2x4 wall Insulated sheathing with R-value \geq <u>R15 in-over</u> 2x6 wall

402.5.2 Material vapor retarder class. The vapor retarder class shall be based on the manufacturer's certified testing or a tested assembly. The following shall be deemed to meet the class specified:

- Class I: Sheet polyethylene, non-perforated aluminum foil
- Class II: Kraft faced fiberglass batts or low perm paint (paint with $0.1 < \text{perm} \leq 1.0$)
- Class III: Latex or enamel paint

402.5.3 Minimum clear air spaces and vented openings for vented cladding. For the purposes of this section vented cladding shall include the following minimum clear air spaces. Other openings with the equivalent vent area shall be permitted.

- ~~1. Stucco with a 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at the top and bottom of each wall.~~
- ~~2. Brick with a 2 inch clear airspace behind the brick with vents at both the top and bottom of the brick. The vents shall be 3/8 inch x 2.5 inch openings every third brick at both the bottom and top course of each wall.~~
- ~~3. Stone or Masonry Veneer with a 2 inch clear airspace behind the stone with vents at the top and bottom. The vents shall have at least 1 square inch of vent area for every 24 inches of wall.~~
- ~~4. Panel Siding with 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at both the top and bottom of each wall.~~
- ~~5. Wood, Wood Based, or Fiber Cement Siding with either a 1/4 inch clear airspace; or alternatively a 1/4 inch gap between the horizontal siding laps.~~
6. 1. Vinyl lap or horizontal aluminum siding applied directly to over a weather resistive barrier as specified in IRC Table R703.4.
2. Brick veneer with a clear airspace as specified in IRC Section R703.7.4.2.
- ~~7. Manufactured Stone Veneer with a 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at both the top and bottom of each wall.~~
8. 3. Other approved vented claddings clear air spaces and vented openings.

502.5.1 Class III vapor retarders. Class III vapor retarders shall be permitted where any one of the conditions in Table 402.5.1 are met.

TABLE 502.5.1
CLASS III VAPOR RETARDERS

Zone	Class III vapor retarders permitted for:
Marine 4	Vented cladding over OSB Vented cladding over Plywood Vented cladding over Fiberboard Vented cladding over Gypsum Insulated sheathing with R-value \geq <u>R2.5 in-over</u> 2x4 wall Insulated sheathing with R-value \geq <u>R3.75 in-over</u> 2x6 wall
5	Vented cladding over OSB Vented cladding over Plywood Vented cladding over Fiberboard Vented cladding over Gypsum Insulated sheathing with R-value \geq <u>R5 in-over</u> 2x4 wall Insulated sheathing with R-value \geq <u>R7.5 in-over</u> 2x6 wall
6	Vented cladding over Fiberboard Vented cladding over Gypsum Insulated sheathing with R-value \geq <u>R7.5 in-over</u> 2x4 wall Insulated sheathing with R-value \geq <u>R11.25 in-over</u> 2x6 wall
7 and 8	Insulated sheathing with R-value \geq <u>R10 in-over</u> 2x4 wall Insulated sheathing with R-value \geq <u>R15 in-over</u> 2x6 wall

502.5.2 Material vapor retarder class. The vapor retarder class shall be based on the manufacturer's certified testing or a tested assembly. The following shall be deemed to meet the class specified:

- Class I: Sheet polyethylene, non-perforated aluminum foil
- Class II: Kraft faced fiberglass batts or low perm paint (paint with $0.1 < \text{perm} \leq 1.0$)
- Class III: Latex or enamel paint

502.5.3 Minimum clear air spaces and vented openings for vented cladding. For the purposes of this section vented cladding shall include the following minimum clear air spaces. Other openings with the equivalent vent area shall be permitted.

- ~~1. Stucco with a 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at the top and bottom of each wall.~~
- ~~2. Brick with a 2 inch clear airspace behind the brick with vents at both the top and bottom of the brick. The vents shall be 3/8 inch x 2.5 inch openings every third brick at both the bottom and top course of each wall.~~
- ~~3. Stone or Masonry Veneer with a 2 inch clear airspace behind the stone with vents at the top and bottom. The vents shall have at least 1 square inch of vent area for every 24 inches of wall.~~
- ~~4. Panel Siding with 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at both the top and bottom of each wall.~~
- ~~5. Wood, Wood Based, or Fiber Cement Siding with either a 1/4 inch clear airspace; or alternatively a 1/4 inch gap between the horizontal siding laps~~
6. 1. Vinyl lap or horizontal aluminum siding applied directly to over a weather resistive barrier as specified in IRC Table R703.4.
2. Brick veneer with a clear airspace as specified in IRC Section R703.7.4.2.
~~7. Manufactured Stone Veneer with a 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at both the top and bottom of each wall.~~
8. 3. Other approved vented claddings clear air spaces and vented openings.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This change updates the vapor retarder requirements to allow more design flexibility and better reflect current methods of construction. This change allows wall assemblies to be constructed to dry inwards, outwards, or to both sides in all climate zones. This change also recognizes that all construction materials have greater or lesser vapor retarding characteristics themselves. The results of a dialogue on vapor retarders that has occurred over four years with a wide range of interested parties are incorporated in the code text proposed here.

Part I (IECC): Part I is the largest part of the change, affecting both the residential and commercial requirements. The IECC committee, with modifications, approved it. This public comment updates the change already approved, primarily to meet deal with concerns expressed by home builders. The most important modification since the first hearing is in the descriptions of the vented openings (IECC Sections 402.5.3 and 502.5.3).

Parts IV, V and VI. No public comments were filed on these three parts. Either the parts of the code they modified were removed by other code changes or further discussion with interested parties showed them to be unnecessary.

This item is on the agenda for individual consideration because public comments were submitted for Part II (IRC).

Public Comment 1:

Joseph Lstiburek, Building Science Corporation, representing himself, requests Approval as Modified by this public comment for Part II.

Modify Part II of proposal as follows:

VAPOR RETARDER CLASS. A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class shall be defined using the desiccant method of ASTM E-96 as follows:

Class I: 0.1 perm or less
 Class II: 0.1 < perm >= 1.0 perm
 Class III: 1.0 < perm >= 10 perm
 Class IV: ~~Greater than 10 perm~~

N1102.5 Vapor Retarders. Class I or II vapor retarders are required on the interior side of frame walls in zones 5, 6, 7, 8 and Marine 4.

Exceptions:

1. Basement walls.
2. Below grade portion of any wall.
3. Construction where moisture or its freezing will not damage the materials.

N1102.5.1 Class III vapor retarders. Class III vapor retarders shall be permitted where any one of the conditions in Table N1102.5.1 are met.

**TABLE N1102.5.1
 CLASS III VAPOR RETARDERS**

Zone	Class III vapor retarders permitted for:
Marine 4	Vented cladding over OSB Vented cladding over Plywood Vented cladding over Fiberboard Vented cladding over Gypsum Insulated sheathing with R-value >= 2.5 in over 2x4 wall Insulated sheathing with R-value >= 3.75 in over 2x6 wall
5	Vented cladding over OSB Vented cladding over Plywood Vented cladding over Fiberboard Vented cladding over Gypsum Insulated sheathing with R-value >= 5 in over 2x4 wall Insulated sheathing with R-value >= 7.5 in over 2x6 wall
6	Vented cladding over Fiberboard Vented cladding over Gypsum Insulated sheathing with R-value >= 7.5 in over 2x4 wall Insulated sheathing with R-value >= 11.25 in over 2x6 wall
7 and 8	Insulated sheathing with R-value >= 10 in over 2x4 wall Insulated sheathing with R-value >= 15 in over 2x6 wall

N1102.5.2 Material vapor retarder class. The vapor retarder class shall be based on the manufacturer's certified testing or a tested assembly.

The following shall be deemed to meet the class specified:

Class I: Sheet polyethylene, non-perforated aluminum foil
 Class II: Kraft faced fiberglass batts
 Class III: Latex paint
 Class IV: ~~House wrap, building paper.~~

N1102.5.3 Minimum clear air spaces and vented openings for vented cladding. For the purposes of this section vented cladding shall include the following minimum clear air spaces. Other openings with the equivalent net-free vent area shall be permitted.

- ~~1. Stucco with a 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at the top and bottom of each wall.~~
 - ~~2. Brick with a 2 inch clear airspace behind the brick with vents at both the top and bottom of the brick. The vents shall be 3/8 inch x 2.5 inch openings every third brick at both the bottom and top course of each wall.~~
 - ~~3. Stone or Masonry Veneer with a 2 inch clear airspace behind the stone with vents at the top and bottom. The vents shall have at least 1 square inch of vent area for every 24 inches of wall.~~
 - ~~4. Panel Siding with 3/8 inch clear airspace with 3/8 inch continuous slot vent openings at both the top and bottom of each wall.~~
 - ~~5. Wood, Wood Based, or Fiber Cement Siding with either a 1/4 inch clear airspace; or alternatively a 1/4 inch gap between the horizontal siding laps~~
 - ~~6. Other approved clear air spaces and vented openings.~~
1. Vinyl lap or horizontal aluminum siding applied over a weather resistive barrier as specified in IRC Table R703.4.
 2. Brick veneer with a clear airspace as specified in IRC Section R703.7.4.2.
 3. Other approved vented claddings.

(Portions of proposal not shown remain unchanged)

Commenter-s Reason: This change updates the vapor retarder requirements to allow more design flexibility and better reflect current methods of construction. This change allows wall assemblies to be constructed to dry inwards, outwards, or to both sides in all climate zones. This change also recognizes that all construction materials have greater or lesser vapor retarding characteristics themselves. The results of a dialogue on vapor retarders that has occurred over four years with a wide range of interested parties are incorporated in the code text proposed here.

Part II (IRC): Part II is for the IRC, including all modifications already approved in the IECC (Part I). Several portions of the code are updated to use the new vapor retarder class definitions.

Parts IV, V and VI. No public comments were filed on these three parts. Either the parts of the code they modified were removed by other code changes or further discussion with interested parties showed them to be unnecessary.

This item is on the agenda for individual consideration because a public comment was submitted for Part III.

Public Comment:

Joseph Lstiburek, Building Science Corporation, representing himself, requests Approval as Modified by this Public Comment for Part III.

Modify Part III of proposal as follows:

VAPOR RETARDER CLASS. A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class shall be defined using the desiccant method of ASTM E-96 as follows:

- Class I: 0.1 perm or less
- Class II: 0.1 < perm >= 1.0 perm
- Class III: 1.0 < perm >= 10 perm
- ~~Class IV: Greater than 10 perm~~

1203.2 Attic spaces. Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. A minimum of 1 inch (25 mm) of airspace shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than ~~4/50~~ 1/300 of the area of the space ventilated, with 50 percent of the required ventilating area provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents.

~~**Exception:** The minimum required not free ventilating area shall be 1/300 of the area of the space ventilated provided 50 percent of the required ventilating area provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above eave or cornice vents, with the balance of the required ventilation provided by eave or cornice vents.~~

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This change updates the vapor retarder requirements to allow more design flexibility and better reflect current methods of construction. This change allows wall assemblies to be constructed to dry inwards, outwards, or to both sides in all climate zones. This change also recognizes that all construction materials have greater or lesser vapor retarding characteristics themselves. The results of a dialogue on vapor retarders that has occurred over four years with a wide range of interested parties are incorporated in the code text proposed here.

Part III (IBC). Part III revises the IBC vapor retarder requirements to be consistent with the commercial requirements in the IECC. It updates the use of the term "vapor retarder" to use the new vapor retarder class definitions. It also removes a redundant exception, as suggested by the committee.

Parts IV, V and VI. No public comments were filed on these three parts. Either the parts of the code they modified were removed by other code changes or further discussion with interested parties showed them to be unnecessary.

Final Hearing Results

EC28-06/07, Part I	AMPC2
EC28-06/07, Part II	AMPC1
EC28-06/07, Part III	AMPC1
EC28-06/07, Part IV	D
EC28-06/07, Part V	D
EC28-06/07, Part VI	D