Alternate Means and Materials for Code Compliance

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DuPont Protective Solutions

Learning Objectives

- ❑Understand how building codes effect innovation
- ❑Review the code compliance and alternate materials and methods criteria
- ❑Understand the role of evaluation agencies and evaluation reports
- ❑Review examples of compliance through alternate methods

Development

Model code language and requirements are written.

Adoption

Codes become law by being adopted by state or local agencies

Implementation

Codes are enforced by local code officials

- Code Interpretation
- Alternate means of compliance

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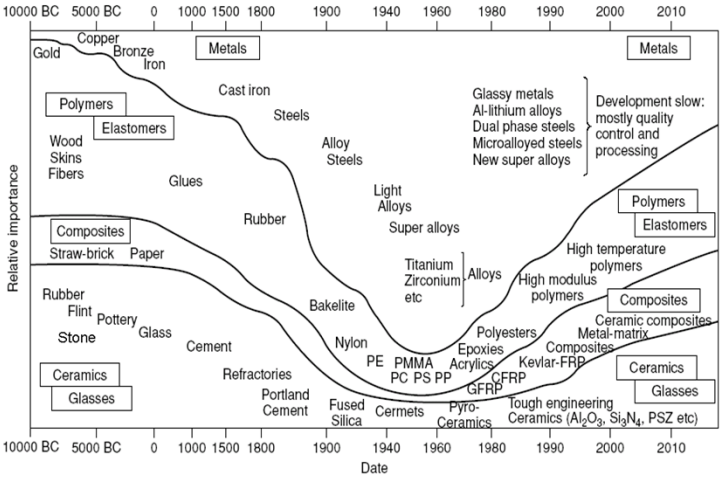
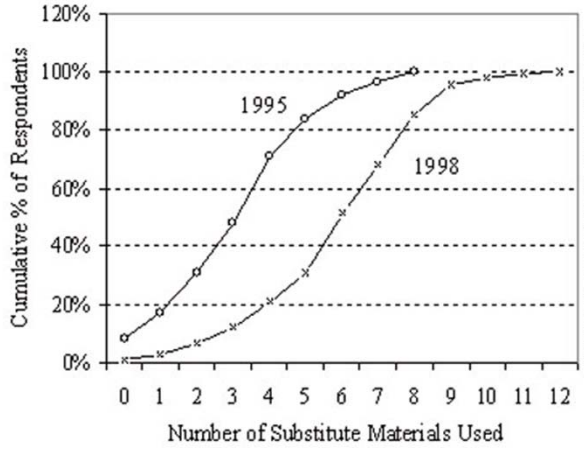
Material Substitution



M.F. Ashby, Materials Selection in Mechanical Design, 1992

Material Substitution



	1995	1998	2001
Wall Framing			
Softwood lumber	93.0%	83.1%	83.4%
Finger-jointed stud	4.0%	5.3%	5.5%
Steel framing*	0.0%	8.8%	6.6%
LVL*	0.0%	0.8%	1.6%
Wood truss	0.0%	1.1%	1.1%
Wood I-joist	0.0%	0.4%	0.4%
Floor Framing			
Wood I-joist	23.0%	38.8%	43.2%
Softwood lumber	59.0%	41.8%	38.6%
Wood truss	16.0%	10.4%	12.7%
LVL	0.0%	3.0%	2.3%
Steel framing	2.0%	2.2%	1.7%
Finger-jointed stud	0.0%	0.3%	0.3%
Roof Framing			
Wood truss	46.0%	47.7%	49.7%
Softwood lumber	51.0%	40.0%	40.9%
Wood I-joist	2.0%	3.4%	3.0%
LVL	0.0%	2.7%	2.7%
Steel framing	1.0%	2.9%	1.7%
Finger-jointed stud	0.0%	1.3%	0.1%

CINTRAFOR, 2001

Codes Identified as Barriers to Innovation

"***Code officials at the local level have the legal authority to accept or reject the application of any new building product or system innovation. They can be the ultimate showstopper***."

-- "***Overcoming Barriers to Innovation in the Home Building Industry***", Report for US HUD PD& R PATH, April 2005)

from Oster and Quigley, "Regulatory Barriers to the Diffusion of Innovation: Some Evidence from Building Codes", The Bell Journal of Economics, Vol. 8, No. 2 (Autumn, 1977), pp 361-377.

The National Commission on Urban Problems (1968) found that unnecessary housing costs are inherent in building codes that

- delay construction,
- prevent the use of modern materials,
- mandate antiquated and outdated provisions,
- inhibit mass production,
- prevent large-scale conventional construction, and
- are questionably administered.

Many communities, even those nominally adhering to model codes, prohibited cost-saving materials and technologies that, generally, were allowed by the model codes. These communities added prohibitions of their own, or did not adopt the latest version of the model codes, etc.

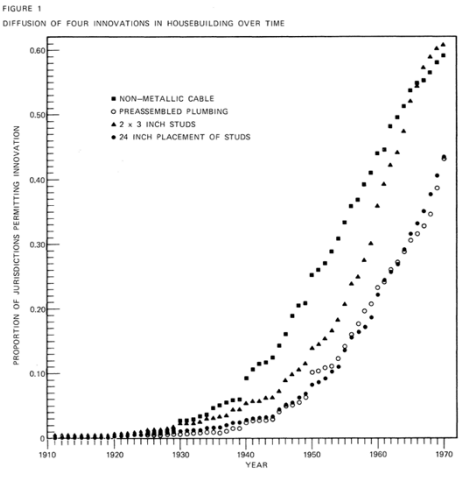
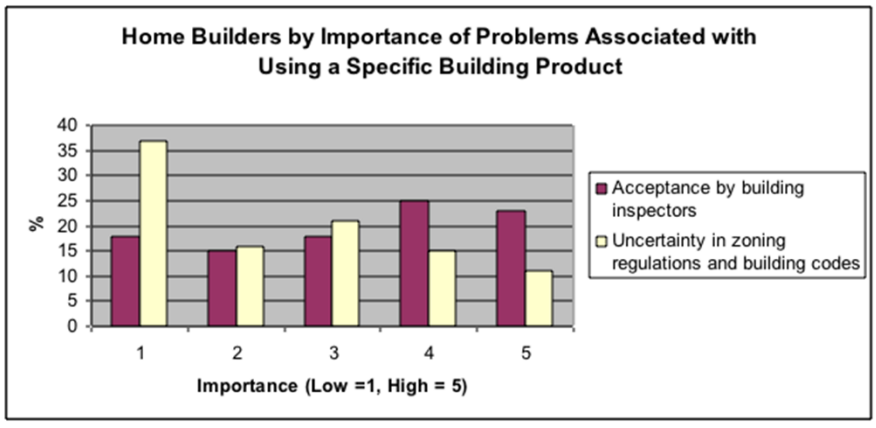


Figure from Oster and Quigley, "Regulatory Barriers to the Diffusion of Innovation: Some Evidence from Building Codes", The Bell Journal of Economics, Vol. 8, No. 2 (Autumn, 1977), pp 361-377. Additional data for Listokin and Hattis

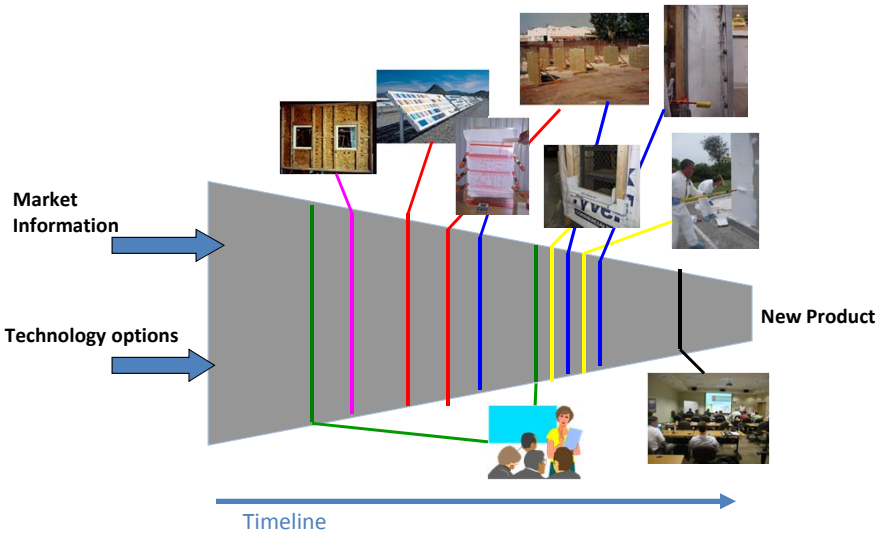
"Building codes—and additional national, regional, or municipal regulations affecting the physical production of houses—prohibit innovation either by explicitly specifying only certain materials and methods, not providing speedy and impartial acceptance in the code where that explicit prohibition does not exist, or by being unfairly interpreted during permitting and inspections -

– *Martín,* ***PATH Program Review & Strategy, Performance Metrics& Operating Plan,*** *US Department of Housing and Urban Development - PATH Draft*



Data from Koebel, et. a., *The Diffusion of Innovation in the Residential Building Industry,* **Report** prepared for the U.S. Department of Housing and Urban Development Office of Policy Development and Research, January 2004

Product Development Process



Code and standard planning critical to innovation deployment

"For an innovation to be accepted by the regulatory system, at a minimum it must be tested, certified, and evaluated. Once an evaluation report is prepared, these early steps may seem easy relative to educating code officials throughout the country about the product. Similarly, changing the model code (and ultimately state and local codes) so that it explicitly allows an innovation can be an even more difficult task. Although each of these steps can be expensive individually, they become more so the longer they are put off because of lack of understanding or bad planning."

– *Hassel et. al., "Building Better Homes, Prepared for the U.S. Department of Housing and Urban Development (HUD) Office of Policy Development and Research and the Partnership for Advancing Technology in Housing (PATH), 2003*

Strategies Used to Gain Approval of Green Product, Material, System, or Design Application

	Sample			
	Code Official		Code User	
Strategy	*N*	Percent	*N*	Percent
Providing adequate supporting information	43	76.8	126	64.0
Starting the approval process early to allow time to work with the building department	33	55.4	108	54.8
Involving the building department staff early in the design process	31	55.4	103	52.3
Providing precedents of code approval of similar approach in other jurisdictions	19	33.9	68	34.5
Providing contact information for building officials in other jurisdictions with experience in the green approach	18	32.1	60	30.5
Using outside experts	16	28.6	60	30.5
Persistence/patience	10	17.9	100	50.8
Other	7	12.5	20	10.2

From Eisenberg, et al., Breaking Down the Barriers: Challenges and Solutions to Code Approval of Green Building, Development Center for Appropriate Technology Report, 2002.

How are materials specified in the code?

Materials / Systems can comply with code three ways:

- ❑Compliance to a direct reference
- ❑Compliance through a referenced standard
- ❑Compliance as an approved alternate material

Example: Compliance to a Direct Reference

IBC 1405.5 Wood veneers. Wood veneers on exterior walls of buildings of Type I, II, III and IV construction shall be not less than 1 inch (25 mm) nominal thickness, 0.438-inch (11.1 mm) exterior hardboard siding or 0.375-inch (9.5 mm) exterior-type wood structural panels or particleboard and shall conform to the following:

Specific materials and thicknesses

1. The veneer shall not exceed 40 feet (12 190 mm) in height above grade. Where fire-retardant-treated wood is used, the height shall not exceed 60 feet (18 290 mm) in height above grade.
2. The veneer is attached to or furred from a noncombustible backing that is fire-resistance rated as required by other provisions of this code.
3. Where open or spaced wood veneers (without concealed spaces) are used, they shall not project more than 24 inches (610 mm) from the building wall.

Attachment and usage criteria

Example: Compliance to a direct reference

R703.2 Water-resistive barrier. One layer of No. 15 asphalt felt, free from holes and breaks, complying with ASTM D226 for Type 1 felt or other approved water-resistive barrier shall be applied over studs or sheathing of all exterior walls. Such felt or material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, felt shall be lapped not less than 6 inches (152 mm). The felt or other approved material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1.

Specific material

Specific installation method

Deemed to Comply

C402.4.1.2.1 Materials. Materials with an air permeability no greater than 0.004 cfm/ft2 (0.02 L/s · m2) under a pressure differential of 0.3 inches water gauge (w.g.) (75 Pa) when tested in accordance with ASTM E 2178 shall comply with this section. **Materials in Items 1 through 15 shall be deemed to comply with this section provided joints are sealed and materials are installed as air barriers in accordance with the manufacturer's instructions.**

1. Plywood with a thickness of not less than 3/8 inch (10 mm).
2. Oriented strand board having a thickness of not less than 3/8 inch (10 mm
3. Extruded polystyrene insulation board having a thickness of not less tha mm).
4. Foil-back polyisocyanurate insulation board having a thickness of not les (12 mm).
5. Closed cell spray foam a minimum density of 1.5 pcf (2.4 kg/m3) having a thickness of not less than 11/2 inches (36 mm).
6. Open cell spray foam with a density between 0.4 and 1.5 pcf (0.6 and 2.4 kg/m3) and having a thickness of not less than 4.5 inches (113 mm).
7. Exterior or interior gypsum board having a thickness of not less than 1/2 inch (12 mm).
8. Cement board having a thickness of not less than 1/2 inch (12 mm).
9. Built up roofing membrane.
10. Modified bituminous roof membrane.
11. Fully adhered single-ply roof membrane.
12. A Portland cement/sand parge, or gypsum plaster having a thickness of not less than 5/8 inch (16 mm).
13. Cast-in-place and precast concrete.
14. Fully grouted concrete block masonry.
15. Sheet steel or aluminum.

Must be installed as an air barrier

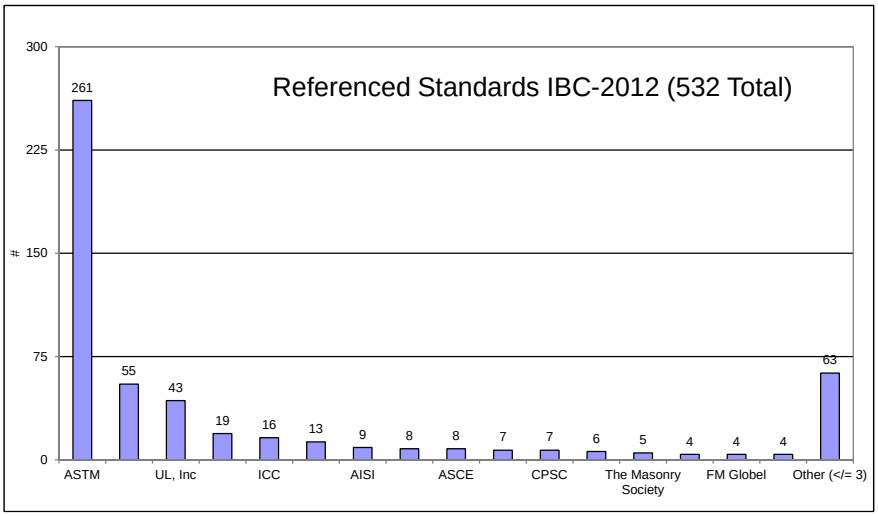
Example: Compliance through a Referenced Standard

2506.2 Standards. Gypsum board and gypsum panel products shall conform to the appropriate standards listed in Table 2506.2 and Chapter 35 and, where required for fire protection, shall conform to the provisions of Chapter 7.

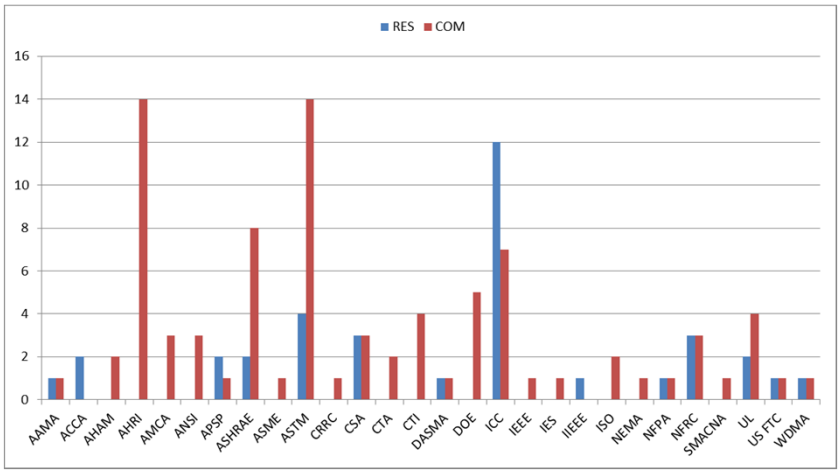
TABLE 2506.2
GYPSUM BOARD AND GYPSUM PANEL PRODUCTS MATERIALS AND ACCESSORIES

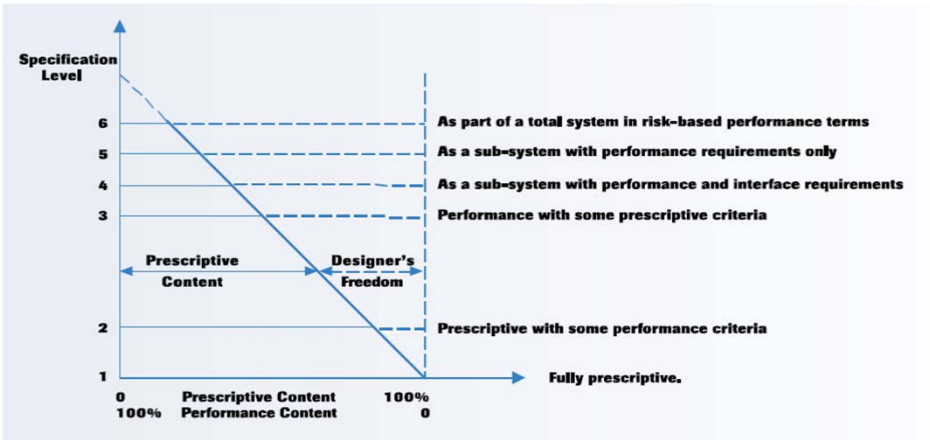
MATERIAL	STANDARD
Cold-formed steel studs and track, structural	AISI S200 and ASTM C 955, Section 8
Cold-formed steel studs and track, nonstructural	AISI S220 and ASTM C 645, Section 10
Elastomeric joint sealants	ASTM C 920
Fiber-reinforced gypsum panels	ASTM C 1278
Glass mat gypsum backing panel	ASTM C 1178
Glass mat gypsum panel 5	ASTM C 1658
Glass mat gypsum substrate	ASTM C 1177
Joint reinforcing tape and compound	ASTM C 474; C 475
Nails for gypsum boards	ASTM C 514, F 547, F 1667
Steel screws	ASTM C 954; C 1002
Standard specification for gypsum board	ASTM C 1396
Testing gypsum and gypsum products	ASTM C 22; C 472; C 473

Referenced standards provide detailed requirements



Reference Standards in the IECC-2015 (36 Residential, 84 Commercial)





from Follette, "Developments in Performance-Based Building Codes and Standard", FOREST PRODUCTS JOURNAL Vol. 50, No. 7/8 JULY/AUGUST 2000

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Compliance as an Approved Alternate Material

IECC-2015 SECTION R102

ALTERNATIVE MATERIALS, DESIGN AND METHODS OF CONSTRUCTION AND EQUIPMENT

R102.1 General. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. The code official shall be permitted to approve an alternative material, design or method of construction where the code 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. .

Codes not intended to prevent innovation

Code official is the judge

Equivalent to code provisions

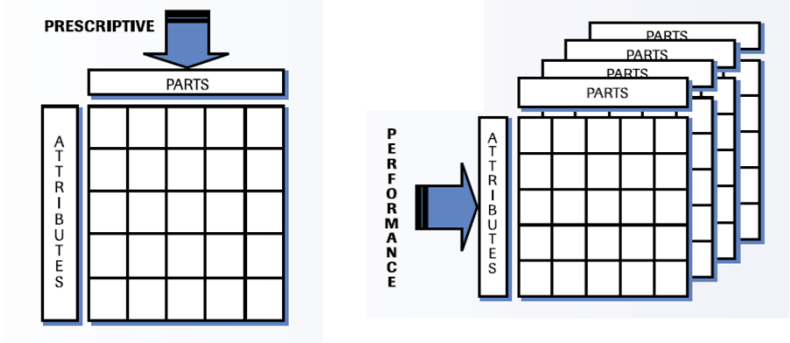
Compliance as an Approved Alternate Material

IBC-2015 104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material 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, not less than the **equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.** Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved.

Codes not intended to prevent innovation

Code official is the judge

Equivalent to code provisions



from Follette, "Developments in Performance-Based Building Codes and Standard", FOREST PRODUCTS JOURNAL Vol. 50, No. 7/8 JULY/AUGUST 2000

"Ideally, construction standards would be a codification of performance specifications for newly constructed dwellings. In practice, however, standards are typically stated in terms of input requirements. To judge the acceptability of an innovation, then, the local building official must first evaluate the results of performance tests conducted by a wide variety of other agencies…on particular materials and designs. Based upon these evaluations, specific standards or input requirements are proposed and promulgated. Thus it appears that the progressiveness of local building codes should be directly related to the professional attributes of the local officials: the amount and type of their professional contact, their backgrounds, and their education."

– *Oster and Quigley, "Regulatory Barriers to the Diffusion of Innovation: Some Evidence from Building Codes", The Bell Journal of Economics, Vol. 8, No. 2 (Autumn, 1977), pp 361-377.*

IBC 2015 Alternate Materials Section

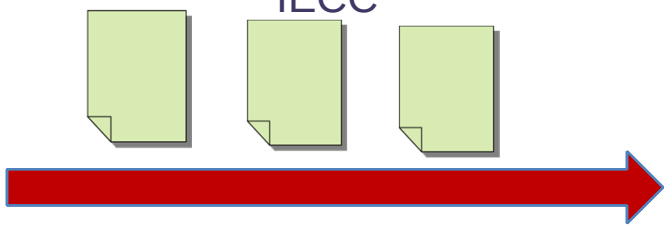
104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has 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, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved.

Code Officials' Reasons for Denial of Green Product, Material, System, or Design Application

Reason	*N*	Percent
Insufficient supporting information to satisfy safety concerns	40	71.4
Insufficient knowledge or technical expertise with the product, material, system, or design	30	53.6
Clear conflict with the intent of the code	28	50.0
Insufficient time in the building department to conduct sufficient research to understand the product, material, system, or design	18	32.1
General unfamiliarity with the product, material, system, or design	15	26.8
Personal experience with failure of the product, material, system, or design	9	16.1
Other	7	12.5
Inability of building department to meet tight schedule of applicant	6	10.7
Knowledge of problem of the approach in other jurisdictions	6	10.7

From Eisenberg, et al., Breaking Down the Barriers: Challenges and Solutions to Code Approval of Green Building, Development Center for Appropriate Technology Report, 2002.

Development of ALTERNATIVE MATERIALS, DESIGN AND METHODS OF CONSTRUCTION AND EQUIPMENT in the IECC



IECC 2003

Section 103

Alternate Materials – Method of construction, design, or insulating systems

103.1 General. The provisions of this code are not intended to prevent the use of any material, method of construction, design or insulating system not specifically prescribed herein, provided that such construction, design or insulating system has been approved by the code official as meeting the intent of the code.

Compliance with specific provisions of this code shall be determined through the use of computer software, worksheets, compliance manuals and other similar materials when they have been approved by the code official as meeting the intent of this code.

IECC 2006

SECTION 103

ALTERNATE MATERIALS—METHOD OF CONSTRUCTION, DESIGN OR INSULATING SYSTEMS

103.1 General. This code is not intended to prevent the use of any material, method of construction, design or insulating system not specifically prescribed herein, provided that such construction, design or insulating system has been approved by the code official as meeting the intent of this code.

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IECC 2012

SECTION 102

ALTERNATE MATERIALS—METHOD OF CONSTRUCTION, DESIGN OR INSULATING SYSTEMS

102.1 General. This code is not intended to prevent the use of any material, method of construction, design or insulating system not specifically prescribed herein, provided that such construction, design or insulating system has been approved by the code official as meeting the intent of this code.

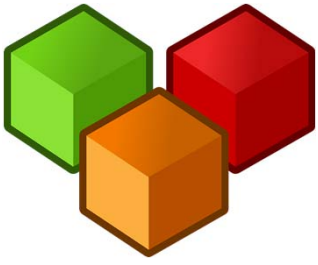
IECC 2015

SECTION R102

ALTERNATIVE MATERIALS, DESIGN AND METHODS OF CONSTRUCTION AND EQUIPMENT

R102.1 General. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. The code official shall be permitted to approve an alternative material, design or method of construction where the code 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. .

Alternate Materials Compliance

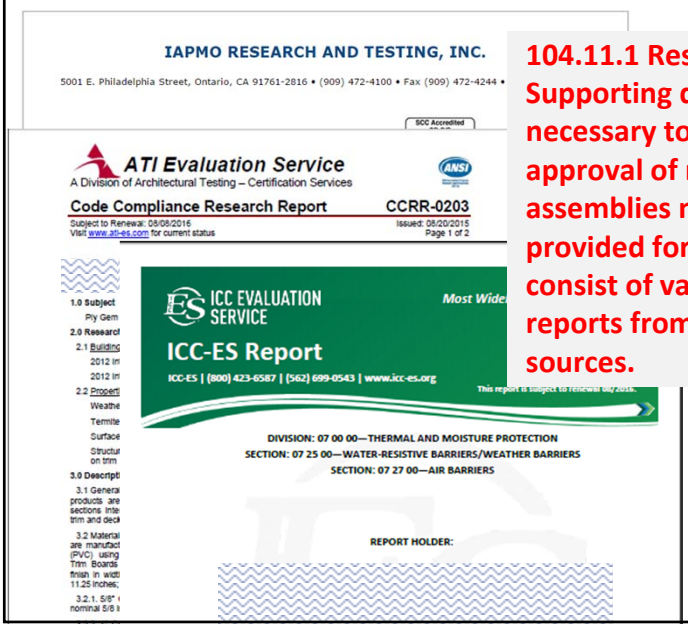


IBC 2015

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material 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, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved.

104.11.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

104.11.2 Tests. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the building official shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction**. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the building official shall approve the testing procedures.** Tests shall be performed by an approved agency. Reports of such tests shall be retained by the building official for the period required for retention of public records.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Code Compliance Research Report CCRR-0203

Subject to Renewal: 08/08/2016 Issued: 08/20/2015

Visit www.ati-es.com for current status Page 1 of 2

ICC EVALUATION SERVICE

ICC-ES Report

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

SECTION: 07 25 00—WATER-RESISTIVE BARRIERS/WEATHER BARRIERS

SECTION: 07 27 00—AIR BARRIERS

REPORT HOLDER:

104.11.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

Home Innovation
NGBS GREEN CERTIFIED SM

THIS IS TO SIGNIFY THAT THE FOLLOWING PRODUCTS FOR RESIDENTIAL CONSTRUCTION

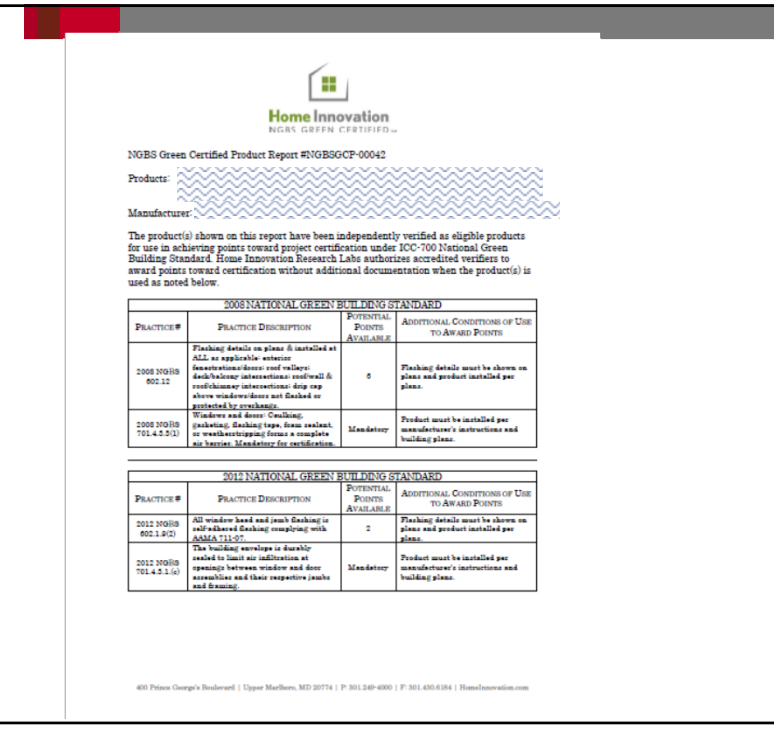
MANUFACTURED BY

HAVE BEEN CERTIFIED FOR POINTS TOWARD NGBS GREEN CERTIFICATION TO THE ICC 700 NATIONAL GREEN BUILDING STANDARD AS DETAILED IN NGBS GREEN CERTIFIED PRODUCT REPORT #NGBSGCP-00042.

Robert L. Hill, Director - Laboratory & Certification Services | June 17, 2009 Approval Date | May 31, 2015 Expiration Date | CERTIFICATE #00042

This certificate is not a representation, warranty, or guarantee of product performance or certification of code compliance. For details of the product warranty, consult the product manufacturer.

Home Innovation Research Labs | 400 Prince George's Boulevard | Upper Marlboro, MD 20774 | HomeInnovation.com/green



Home Innovation
NGBS GREEN CERTIFIED SM

NGBS Green Certified Product Report #NGBSGCP-00042

Products:

Manufacturer:

The product(s) shown on this report have been independently verified as eligible products for use in achieving points toward project certification under ICC-700 National Green Building Standard. Home Innovation Research Labs authorizes accredited verifiers to award points toward certification without additional documentation when the product(s) is used as noted below.

2008 NATIONAL GREEN BUILDING STANDARD

Practice #	Practice Description	Potential Points Available	Additional Conditions of Use to Award Points
2008 NGBS 602.12	Flashing details on plans & installed at ALL as applicable: exterior fenestrations/doors; roof valleys; deck/balcony interactions; roof/wall & roof/chimney interactions; drip cap above windows/doors not flashed or protected by overhangs.	6	Flashing details must be shown on plans and product installed per plans.
2008 NGBS 701.4.5.3(1)	Windows and doors: Caulking, gasketing, flashing tape, foam sealant, or weatherstripping forms a complete air barrier. Mandatory for certification.	Mandatory	Product must be installed per manufacturer's instructions and building plans.

2012 NATIONAL GREEN BUILDING STANDARD

Practice #	Practice Description	Potential Points Available	Additional Conditions of Use to Award Points
2012 NGBS 602.1.9(2)	All window head and jamb flashing is self-adhered flashing complying with AAMA 711-07.	2	Flashing details must be shown on plans and product installed per plans.
2012 NGBS 701.4.5.1(c)	The building envelope is durably sealed to limit air infiltration at openings between window and door assemblies and their respective jambs and framing.	Mandatory	Product must be installed per manufacturer's instructions and building plans.

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ICC-ES Acceptance Criteria

"Acceptance criteria are developed by the ICC-ES technical staff in consultation with the report applicant and with input from interested parties."

"New criteria and revisions to criteria are approved by the Evaluation Committee (made up entirely of code officials) during open public hearings or—in selected instances—through an alternate process that involves the solicitation of public comment through this web site."

"A criteria qualifies for the alternative process only if, in the opinion of ICC-ES staff, it meets one or more of the following requirements:

- **The subject is nonstructural, does not involve life-safety, and is already addressed in nationally recognized standards or generally accepted industry standards.**
- **The subject requires its own criteria, but precedent for the new document already exists in other criteria or in the code.**
- **Relatively minor (noncontroversial) revisions are being proposed to an existing criteria."**

Source: www.icc-es.org

Example: Moving from Alternate to Code Specified

SECTION 1408
EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)

1408.1 General. The provisions of this section shall govern the materials, construction and quality of exterior insulation and finish systems (EIFS) for use as *exterior wall coverings* in addition to other applicable requirements of Chapters 7, 14, 16, 17 and 26.

1408.2 Performance characteristics. EIFS shall be constructed such that it meets the performance characteristics required in ASTM E 2568.

[BS] 1408.3 Structural design. The underlying structural framing and substrate shall be designed and constructed to resist loads as required by Chapter 16.

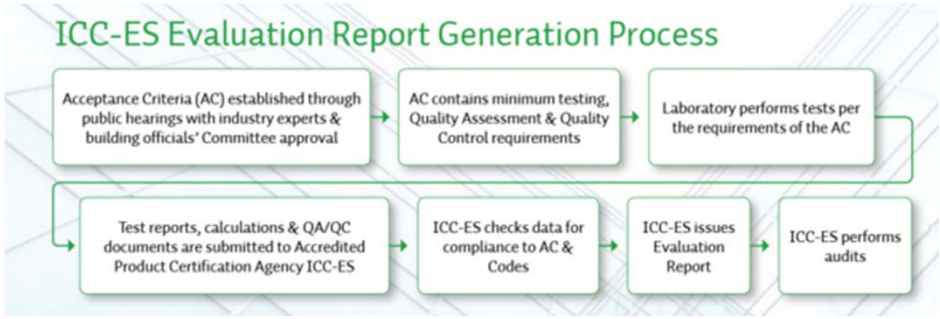
1408.4 Weather resistance. EIFS shall comply with Section 1403 and shall be designed and constructed to resist wind and rain in accordance with this section and the manufacturer's application instructions.

1408.4.1 EIFS with drainage. EIFS with drainage shall have an average minimum drainage efficiency of 90 percent when tested in accordance the requirements of ASTM E 2273 and is required on framed walls of Type V construction, Group R1, R2, R3 and R4 occupancies.

1408.4.1.1 Water-resistive barrier. For EIFS with drainage, the *water-resistive barrier* shall comply with Section 1404.2 or ASTM E 2570.

1408.5 Installation. Installation of the EIFS and EIFS with drainage shall be in accordance with the EIFS manufacturer's instructions.

1408.6 Special inspections. EIFS installations shall comply with the provisions of Sections 1704.2 and 1705.16.



Source: www.icc-es.org

Evaluations have been conducted across a wide range of product areas:

DIVISION 01 00 00 GENERAL REQUIREMENTS

DIVISION 03 00 00 CONCRETE

DIVISION 04 00 00 MASONRY

DIVISION 05 00 00 METALS

DIVISION 06 00 00 WOOD, PLASTICS AND COMPOSITES

DIVISION 07 00 00 THERMAL AND MOISTURE PROTECTION

DIVISION 08 00 00 OPENINGS

DIVISION 09 00 00 FINISHES

DIVISION 10 00 00 SPECIALTIES

DIVISION 11 00 00 EQUIPMENT

DIVISION 13 00 00 SPECIAL CONSTRUCTION

DIVISION 14 00 00 CONVEYING EQUIPMENT

DIVISION 21 00 00 FIRE SUPPRESSION

DIVISION 22 00 00 PLUMBING

DIVISION 23 00 00 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

DIVISION 25 00 00 INTEGRATED AUTOMATION

DIVISION 26 00 00 ELECTRICAL

DIVISION 27 00 00 COMMUNICATIONS

DIVISION 28 00 00 ELECTRONIC SAFETY AND SECURITY

DIVISION 31 00 00 EARTHWORK

DIVISION 32 00 00 EXTERIOR IMPROVEMENTS

DIVISION 33 00 00 UTILITIES

DIVISION 40 00 00 PROCESS INTEGRATION

DIVISION 07 00 00 THERMAL AND MOISTURE PROTECTION

07 11 00 - Dampproofing
07 13 00 - Sheet Waterproofing
07 14 00 - Fluid-Applied Waterproofing
07 18 13 - Pedestrian Traffic Coatings
07 21 00 - Thermal Insulation
07 22 00 - Roof and Deck Insulation
07 24 00 - Exterior Insulation and Finish Systems
07 24 19 - Water-Drainage Exterior Insulation and Finish System
07 25 00 - Water-Resistive Barriers/Weather Barriers
07 27 00 - Air Barriers
07 30 05 - Roofing Felt and Underlayment
07 31 00 - Shingles and Shakes
07 31 13 - Asphalt Shingles
07 31 16 - Metal Shingles
07 31 29 - Wood Shingles and Shakes
07 31 33 - Composite Rubber Shakes
07 31 53 - Plastic Shakes
07 32 00 - Roof Tiles
07 32 01 - Roof Tile Accessories
07 32 03 - Roof Tile Adhesive
07 32 13 - Clay Roof Tiles
07 32 16 - Concrete Roof Tiles
07 32 19 - Metal Roof Tiles
07 32 26 - Plastic Roof Tiles
07 40 00 - Roofing and Siding Panels
07 41 00 – Roof Panels
07 41 13 - Metal Roof Panels
07 41 43 - Composite Roof Panels
07 42 13 - Metal Wall Panels
07 42 43 - Composite Wall Panels
07 44 00 - Faced Panels
07 44 16 - Porcelain Enameled Faced Panels
07 44 53 - Glass-Fiber-Reinforced Cementitious Panels
07 46 00 - Siding
07 46 23 - Wood Siding
07 46 33 - Plastic Siding
07 46 46 - Fiber-Cement Siding
07 52 00 - Modified Bituminous Sheet Roofing
07 53 23 - Ethylene-Propylene-Diene-Monomer Roofing
07 54 00 - Thermoplastic Membrane Roofing
07 54 19 - Polyvinyl-Chloride Roofing
07 54 23 - Thermoplastic-Polyolefin Roofing
07 56 00 - Fluid-Applied Roofing
07 57 00 - Coated Foam Roofing
07 65 00 - Flexible Flashing
07 71 16 - Manufactured Counterflashing Systems
07 72 26 - Ridge Vents
07 72 27 - Eave Vents
07 72 29 - Roof Exhaust Vents
07 77 00 - Wall Specialties
07 81 00 - Applied Fireproofing
07 81 33 - Mineral-Fiber Fireproofing
07 84 00 - Firestopping
07 84 16 - Annular Space Protection
07 87 00 - Smoke Containment Barriers

07 21 00 - Thermal Insulation

6 Acceptance Criteria

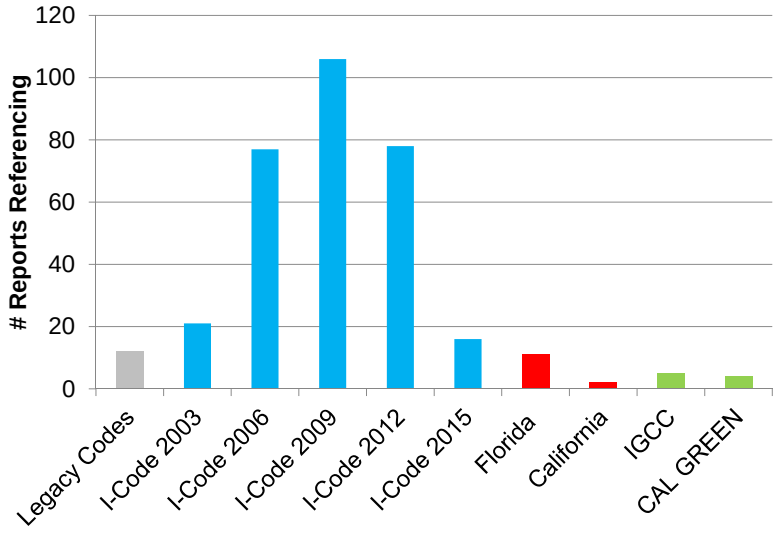
- AC02 Reflective Insulation
- AC12 Foam Plastic
- AC81 Cotton Fiber Insulation
- AC187 Polyester Loose-fill & Blanket Insulations
- AC220 Sheet Radiant Barriers
- AC377 Spray Applied Foam Plastic Insulation

106 Evaluation Reports

5 VAR Environmental Reports

14 Listing Reports

Report Code References



07 25 00 – Water Resistive Barrier

6 Acceptance Criteria

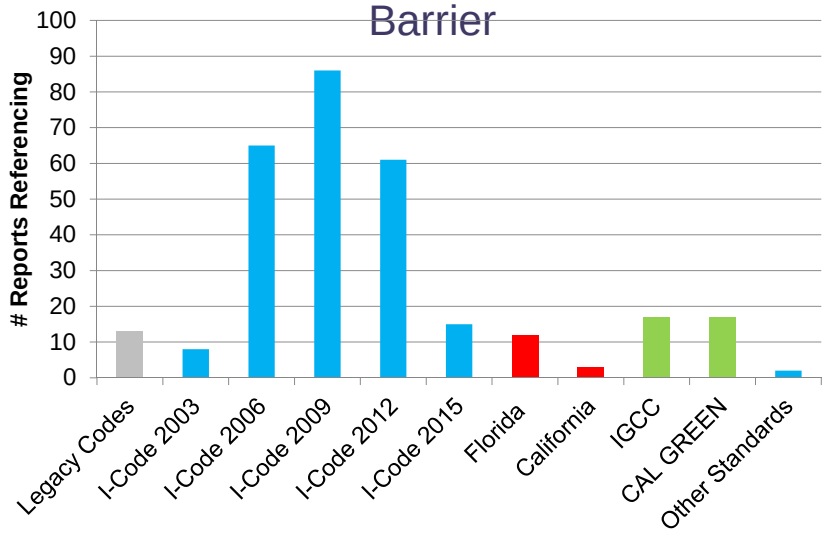
- AC38 Water-Resistive Barrier
- AC71 Foam Plastic Sheathing Panels used as Weather-resistive Barriers
- AC209 Trowel, Spray Applied Water-Resistive Coatings used as Weather-resistive Barriers over Exterior Cementious Wall Coverings
- AC212 Water-resistive Coatings used as Water-resistive Barriers over Exterior Sheathing
- AC310 Water-resistive Membranes Factory Bonded to Wood-based Structural Sheathing, used as a Water-resistive Barriers
- AC382 Laminated Fibrous Board Sheathing Material used as a Water-resistive Barrier

90 Evaluation Reports

2 VAR Environmental Reports

4 Listing Reports

Report Code References – Water Resistive Barrier



Example: Compliance to a direct reference

R703.2 Water-resistive barrier. One layer of No. 15 asphalt felt, free from holes and breaks, complying with ASTM D226 for Type 1 felt or other approved water-resistive barrier shall be applied over studs or sheathing of all exterior walls. Such felt or material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, felt shall be lapped not less than 6 inches (152 mm). The felt or other approved material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1.

Specific material

Specific installation method

Water-Resistive Barriers

Building Papers / Felts

Building Wraps

- Perforated Wraps
- Non-Perforated Wraps
- Specialty Wraps
- Self-Adhesive Wraps

Fluid Applied

Sheathings

- Foam Sheathing
- WRB Laminated Wood-Based Sheathing
- Laminated Fibrous Sheathing

ICC-ES AC38

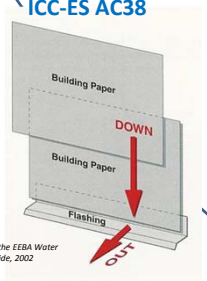
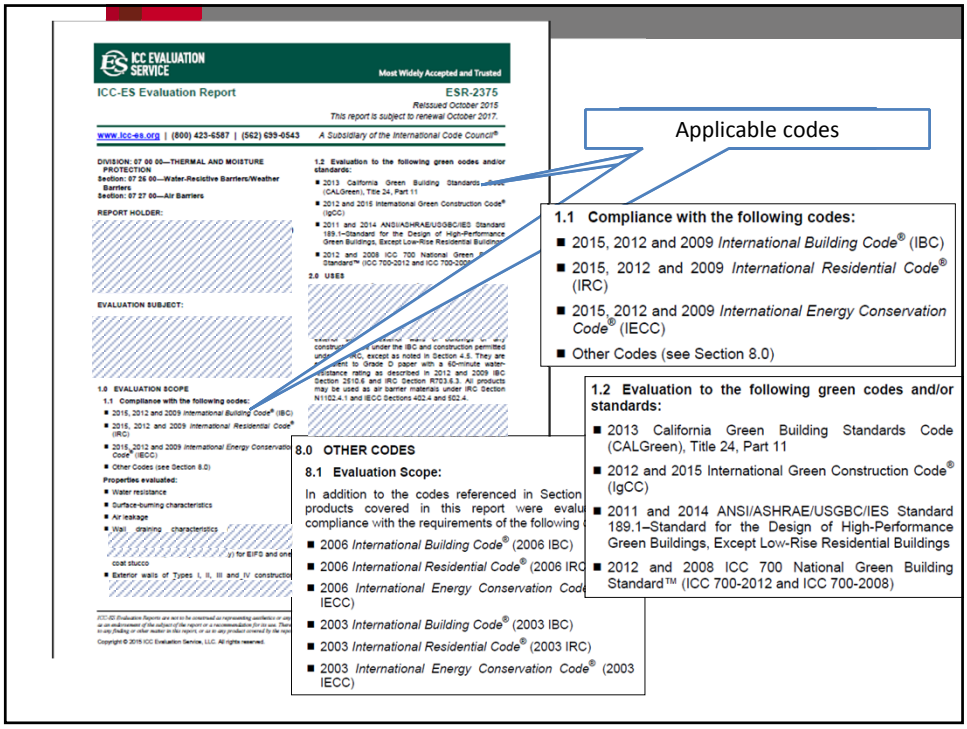


Illustration from the EEBA Water Management Guide, 2002

	Material		Installation
Prescriptive Requirement	#15 Felt (ASTM D226 Type I)		Horizontally Lapped
Alternate Materials	Grade D Building Paper	AC38	Horizontally Lapped as Prescribed in Code
	Housewraps	AC38	Horizontally Lapped as Prescribed in Code
	Foam Plastic Sheathing Panels	AC71	Joint Treatment tested per AC71
	Trowel-, Spray-, or Roller-Applied Water Resistive Coatings over Exterior Cementitious Wall Coverings	AC209	Resistance to Joint Movement tested per AC209
	Water-Resistive Coatings over Exterior Sheathing	AC212	Resistance to Joint Movement tested per AC209
	Water Resistive Membrandes Factory –Bonded to Wood-Based Structural Sheathing	AC310	Joint Treatment tested per AC310
	Laminated Fibrous Board Sheathing	AC382	Joint Treatment tested per AC382


ICC EVALUATION SERVICE
Most Widely Accepted and Trusted
ICC-ES Evaluation Report
ESR-2375
Reissued October 2015
This report is subject to renewal October 2017.
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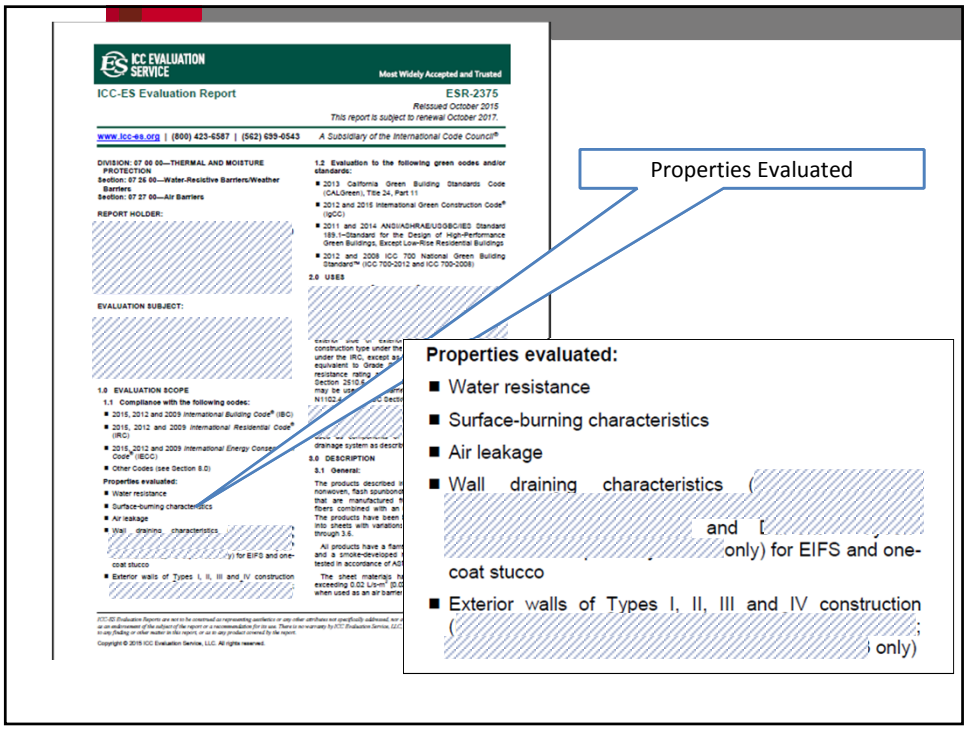
DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 26 00—Water-Resistive Barriers/Weather Barriers
Section: 07 27 00—Air Barriers
REPORT HOLDER:
EVALUATION SUBJECT:
1.0 EVALUATION SCOPE
1.1 Compliance with the following codes:
2015, 2012 and 2009 International Building Code® (IBC)
2015, 2012 and 2009 International Residential Code® (IRC)
2015, 2012 and 2009 International Energy Conservation Code® (IECC)
Other Codes (see Section 8.0)
Properties evaluated:
Water resistance
Surface-burning characteristics
Air leakage
Wall draining characteristics
Exterior walls of Types I, II, III and IV construction
1.2 Evaluation to the following green codes and/or standards:
2013 California Green Building Standards Code (CALGreen), Title 24, Part 11
2012 and 2015 International Green Construction Code® (IgCC)
2011 and 2014 ANSI/ASHRAE/USGBC/IES Standard 189.1–Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings
2012 and 2008 ICC 700 National Green Building Standard™ (ICC 700-2012 and ICC 700-2008)
2.0 USES
8.0 OTHER CODES
8.1 Evaluation Scope:
In addition to the codes referenced in Section
products covered in this report were evalu
compliance with the requirements of the following
2006 International Building Code® (2006 IBC)
2006 International Residential Code® (2006 IRC
2006 International Energy Conservation Cod
IECC)
2003 International Building Code® (2003 IBC)
2003 International Residential Code® (2003 IRC)
2003 International Energy Conservation Code® (2003 IECC)
Applicable codes
1.1 Compliance with the following codes:
2015, 2012 and 2009 International Building Code® (IBC)
2015, 2012 and 2009 International Residential Code® (IRC)
2015, 2012 and 2009 International Energy Conservation Code® (IECC)
Other Codes (see Section 8.0)
1.2 Evaluation to the following green codes and/or standards:
2013 California Green Building Standards Code (CALGreen), Title 24, Part 11
2012 and 2015 International Green Construction Code® (IgCC)
2011 and 2014 ANSI/ASHRAE/USGBC/IES Standard 189.1–Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings
2012 and 2008 ICC 700 National Green Building Standard™ (ICC 700-2012 and ICC 700-2008)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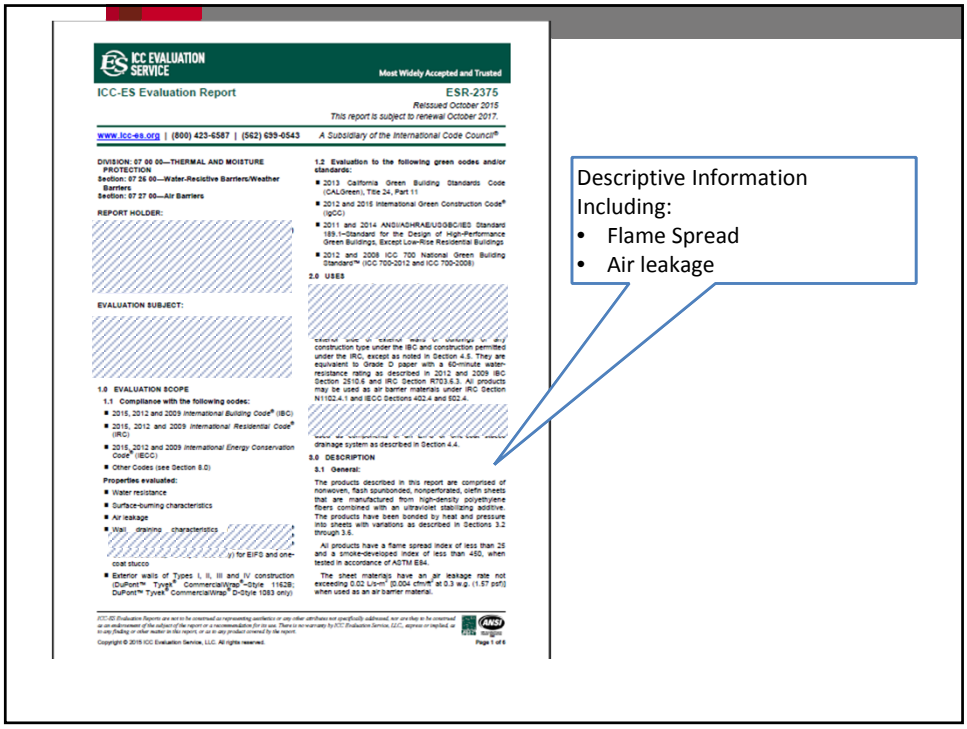
Section: 07 26 00—Water-Resistive Barriers/Weather Barriers
Section: 07 27 00—Air Barriers
REPORT HOLDER:
EVALUATION SUBJECT:
1.0 EVALUATION SCOPE
1.1 Compliance with the following codes:
Properties evaluated:
Water resistance
Surface-burning characteristics
Air leakage
Wall draining characteristics
Exterior walls of Types I, II, III and IV construction
2.0 USES
3.0 DESCRIPTION
Properties Evaluated
Properties evaluated:
Water resistance
Surface-burning characteristics
Air leakage
Wall draining characteristics
only) for EIFS and one-coat stucco
Exterior walls of Types I, II, III and IV construction
only)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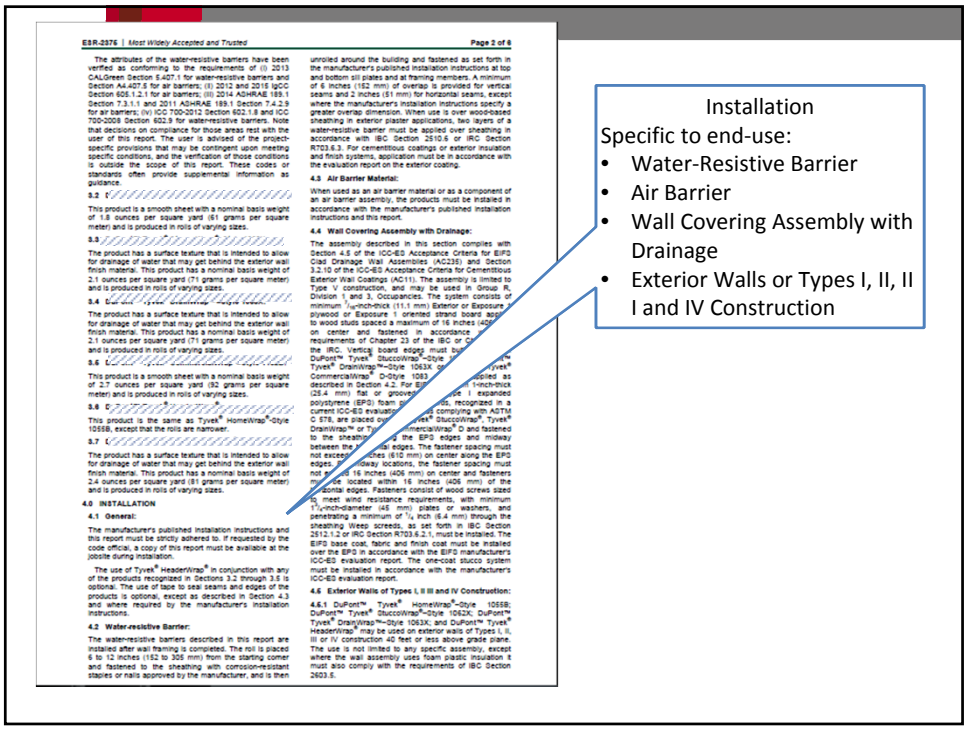
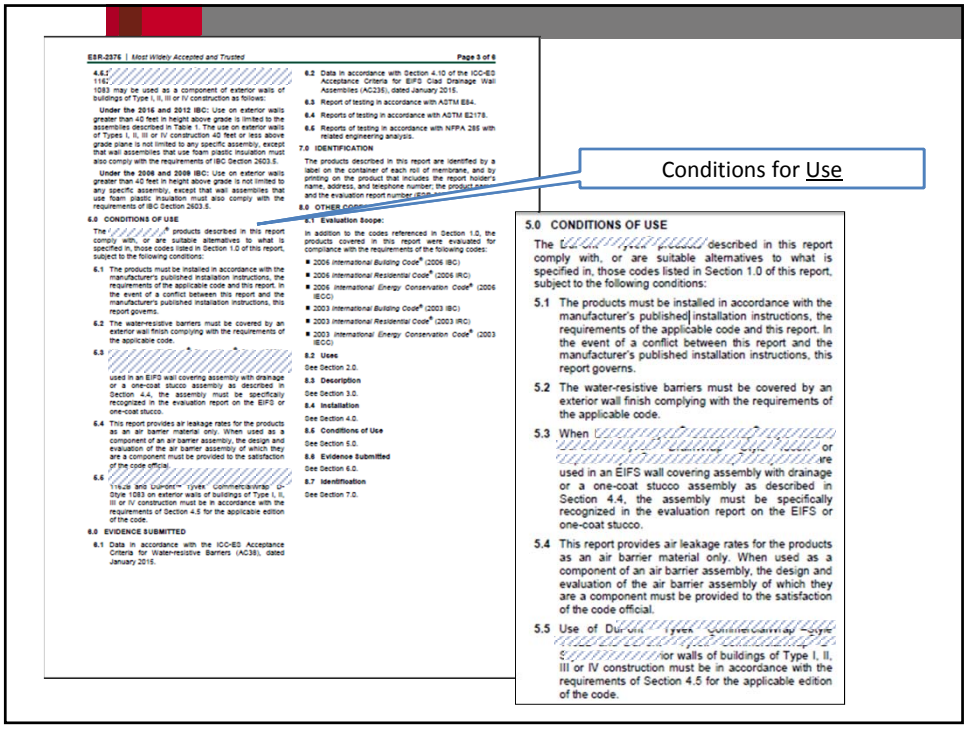
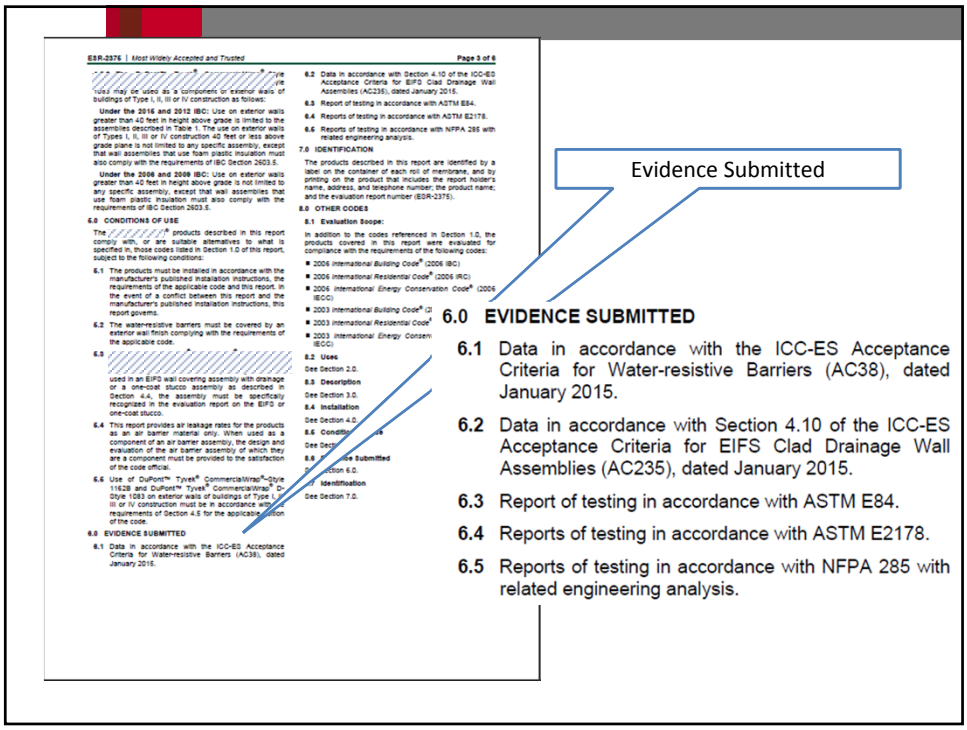
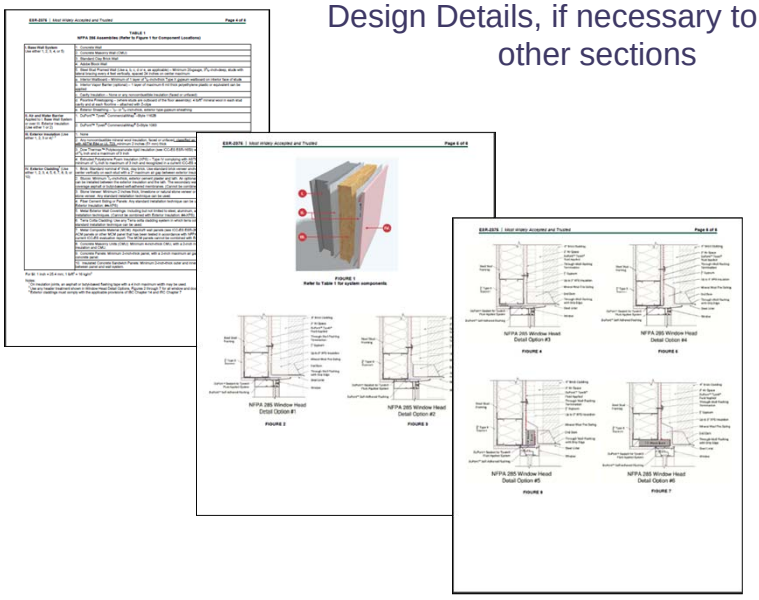
DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 26 00—Water-Resistive Barriers/Weather Barriers
Section: 07 27 00—Air Barriers
REPORT HOLDER:
EVALUATION SUBJECT:
1.0 EVALUATION SCOPE
1.1 Compliance with the following codes:
2.0 USES
3.0 DESCRIPTION
3.1 General:
Descriptive Information Including:
• Flame Spread
• Air leakage


ESR-2375 | Most Widely Accepted and Trusted
Page 2 of 8
4.0 INSTALLATION
4.1 General:
4.2 Water-resistive Barrier:
4.3 Air Barrier Material:
4.4 Wall Covering Assembly with Drainage:
4.5 Exterior Walls of Types I, II III and IV Construction:
Installation Specific to end-use:
• Water-Resistive Barrier
• Air Barrier
• Wall Covering Assembly with Drainage
• Exterior Walls or Types I, II, II I and IV Construction

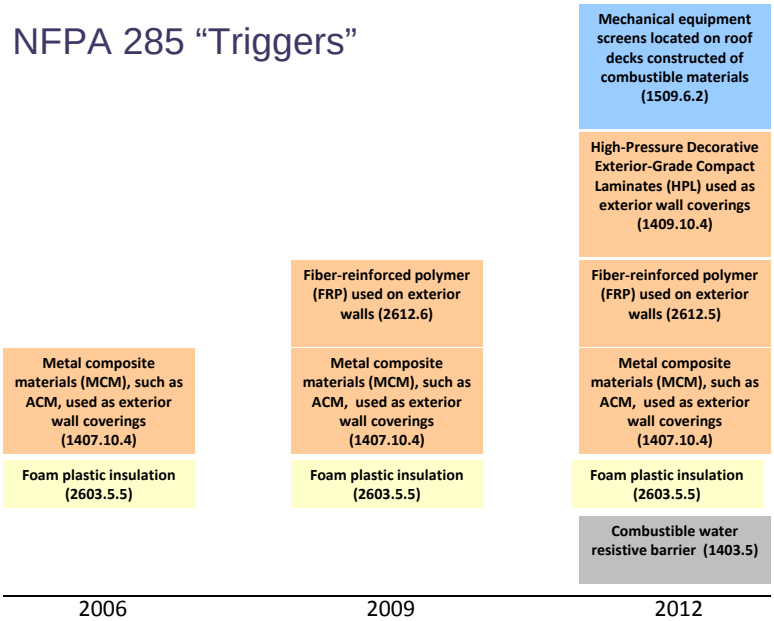

Conditions for Use
5.0 CONDITIONS OF USE
The described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:
5.1 The products must be installed in accordance with the manufacturer's published installation instructions, the requirements of the applicable code and this report. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.
5.2 The water-resistive barriers must be covered by an exterior wall finish complying with the requirements of the applicable code.
5.3 When or are used in an EIFS wall covering assembly with drainage or a one-coat stucco assembly as described in Section 4.4, the assembly must be specifically recognized in the evaluation report on the EIFS or one-coat stucco.
5.4 This report provides air leakage rates for the products as an air barrier material only. When used as a component of an air barrier assembly, the design and evaluation of the air barrier assembly of which they are a component must be provided to the satisfaction of the code official.
5.5 Use of or walls of buildings of Type I, II, III or IV construction must be in accordance with the requirements of Section 4.5 for the applicable edition of the code.


Evidence Submitted
6.0 EVIDENCE SUBMITTED
6.1 Data in accordance with the ICC-ES Acceptance Criteria for Water-resistive Barriers (AC38), dated January 2015.
6.2 Data in accordance with Section 4.10 of the ICC-ES Acceptance Criteria for EIFS Clad Drainage Wall Assemblies (AC235), dated January 2015.
6.3 Report of testing in accordance with ASTM E84.
6.4 Reports of testing in accordance with ASTM E2178.
6.5 Reports of testing in accordance with NFPA 285 with related engineering analysis.

Design Details, if necessary to explain other sections



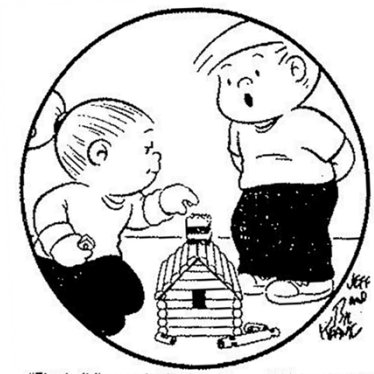
NFPA 285 "Triggers"



IBC 2015 Alternate Materials Section

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material 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, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved.

Summary



"The building code doesn't allow a LEGO chimney on a Lincoln Log cabin."

- ❑ **Alternate materials and methods allow for innovation**
- ❑ **Evaluation reports are an important resource to the code official**
- ❑ **Code official is the ultimate authority**

Questions