Proposed Amendments to the International Building Code, 2009 edition, Relating to High Performance Building Requirements for Sustainability

Version 2.0 September 2010

These amendments to the International Building Code are intended to provide high performance building requirements for use by state and local governments and Federal Agencies to implement sustainable or green building initiatives. The requirements are formatted to facilitate adoption as amendments to the 2009 *International Building Code*. In addition to energy efficiency and typical sustainability criteria, enhanced sustainability is accomplished with requirements for increased disaster resistance and improved durability.

Institute for Business & Home Safety

This document is based in part on the requirements for the ***Fortified … for safer living***® guide. It's use does not constitute compliance with the ***Fortified … for safer living***® program. For specific requirements and procedures for compliance refer to the Institute for Business and Home Safety website which can be found at www.disastersafety.org or contact IBHS at 813-286-3400.

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CHAPTER 1
ADMINISTRATION

SECTION 101
GENERAL

[Revise Section 101.1 as follows:]

101.1 Title. These regulations shall be known as the Building Code with high performance requirements of [Name of Jurisdiction] and hereinafter referred to as "this code."

[Revise Section 101.2 as follows:]

101.2 Scope. The provisions of this code shall.....(No change to text).....to such buildings or structures.

Exceptions:

1. Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories above grade plane in height with a separate means of egress and their accessory structures shall comply with the *International Residential Code*.

2. Group U occupancies shall be permitted to comply with the *International Building Code*

101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted.

[Revise Section 101.3 as follows:]

101.3 Intent. The purpose of this code is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, building sustainability and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations.

[Revise section 101.4 and add new Section 101.4.7 as follows:]

101.4 Referenced Codes. Codes listed in Sections 101.4.1 through ~~101.4.6~~ 101.4.7 and referenced elsewhere in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference. The provisions of this code shall supersede any less stringent requirements of the referenced codes.

101.4.7 Wildland Fires. The provisions of the International Code Council (ICC) *International Wildland-Urban Interface Code* shall apply to the construction, alteration, movement, repair, maintenance and use of any building, structure or premises within the wildland interface areas in this jurisdiction.

SECTION 101
GENERAL

C101.1 Title. Amends the title of the IBC to establish the combination of the 2009 IBC and this document as the High Performance Building Code.

C101.2 Scope. Adds an exception to permit Group U occupancies from complying with this code. Given the types of structures containing Group U occupancies, very little would be achieved in terms of high performance features. Most of these structures are not conditioned and typically do not have occupants.

C101.3 Intent. Adds building sustainability to the intent of this code. Sustainability is the main difference between a high performance code and a minimum building code such as the *International Building Code*. Sustainability takes on many forms related to building design, construction, functionality, life cycle costs and impact to the environment. This code incorporates all of these features and combines them into a comprehensive high performance sustainable building code.

C101.4.7 Wildland Fires. This section requires the adoption and enforcement of the *International Wildland-Urban Interface Code* within the jurisdiction. The *International Wildland-Urban Interface Code (IWUIC)* regulates exposed exterior construction on the walls, roof, decks, soffit and other exposed exterior surfaces as well as mandating a radius around the structure that must be kept clear of trees, shrubs, brush, etc. The requirements

SECTION 107
SUBMITTAL DOCUMENTS

[Modify Section 107.2 as follows:]

107.2 Construction documents. *Construction documents* shall be in accordance with Sections 107.2.1 through 107.2.~~5~~ 7

(No change to 107.2.1 through 107.2.5)

[Add new Section 107.2.6 as follows]

107.2.6 Design service life plan. A design service life plan (DSLP) shall be provided to the owner for approval prior to the application for a permit. The DSLP shall comply with the provisions of this section.

107.2.6.1 Design service life. The DSLP shall use a design service life of not less than 60 years.

Exceptions:

1. For temporary structures permitted in Section 108, the DSLP is only required to include cost estimates for removal and disposal of materials and products.
2. Group F and S buildings shall be permitted to have a 25 year DSLP when approved by the building official.

107.2.6.2 DSLP scope. The DSLP shall include routine repair, maintenance, replacement, and disposal cost estimates for the design service life of the building for the following components.

1. Exterior Walls in accordance with Chapter 14,
2. Roof Assemblies and Rooftop Structures in accordance with Chapter 15,

of the *IWUIC* only apply to those areas where the authority having jurisdiction deems to have a higher potential for a wildland-urban fire from the presence of quick-burning forage, limited fire department access, prevalent weather conditions or other mitigating conditions.

Wildland urban interface fires commonly occur throughout the United States and the effects can be catastrophic when the weather and terrain conditions are windy and dry. States along the west coast, especially California, experience very dry and windy conditions throughout much of the summer and fall months and are more susceptible to out-of-control wildland fires due to forage type and sustained winds. States in the remainder of the country, especially those located on the east coast also have a large potential for wildland/urban fires to cause catastrophic fire losses if the conditions are right. Population densities along the east coast, especially in wildland/urban areas, are higher compared to the west coast thus increasing the amount of potential damage.

SECTION 107
SUBMITTAL DOCUMENTS

C107.2.6 Service Life Plan. Requires that a service-life plan be developed and provided to the owner prior to application for a building permit. A service-life plan will provide the owner with valuable decision-making information on what the overall maintenance cost will be based on the material selected. Maintaining the sustainable systems and building components is critical to maintaining a high performance building.

3. Concrete in accordance with Chapter 19,

4. Aluminum in accordance with Chapter 20,

5. Masonry in accordance with Chapter 21,

6. Steel in accordance with Chapter 22,

7. Wood in accordance with Chapter 23,

8. Glass and Glazing in accordance with Chapter 24,

9. Gypsum Board and Plaster in accordance with Chapter 25, and

10. Plastics in accordance with Chapter 26,

107.2.6.3 DSLP criteria. The DSLP shall include the following:

1. Building components with descriptions of materials and products.

2. Schedule of routine maintenance, repair, replacement and disposal, for each component.

107.2.6.4 DSLP retention. The DSLP shall be retained for the design service life of the building, and upon request, made available for review by the authority having jurisdiction. During the design service life of the building, the DSLP shall be transferred to each subsequent owners.

107.2.7 Peer review statement. The *construction documents* for buildings more than 75 ft in height or having long span roofs with spans exceeding 150 feet submitted with the application for *permit* shall be accompanied by documentation that the structural design has been peer reviewed by another *registered design professional*.

SECTION 111
CERTIFICATE OF OCCUPANCY

[Revise Section 111.2 (8) as follows:]

111.2 Certificate issued. After the building official inspects .....(No change to text).....shall issue a certificate of occupancy that contains the following:

(No change to items 1-7)

8. The use and occupancy, in accordance with the provisions of Chapter 3. Buildings designed and constructed in accordance with this code shall include the designation (–HP) after the occupancy classification.

(No change to Items 9-12)

SECTION 111
CERTIFICATE OF OCCUPANCY

C111.2 Certificate issued. Identifies that a Certificate of Occupancy be issued for all new buildings after construction is complete and the building can be safely occupied. Stipulates that an identifier (-HP) be added to the occupancy group on the Certificate of Occupancy to designate that the building has been constructed under the HPBRS. This provision distinguishes buildings constructed under this code and provides a visual notification for fire and maintenance inspectors.

Maintaining the high performance features of structures, as built in accordance with this code, is critical to the resiliency and sustainability of the structure as well as the impact on the environment. This designation can be used with the current IBC classification system to assist jurisdictions in keeping track of the resilient, sustainable building stock as well as fire safety and maintenance inspections.

CHAPTER 2
DEFINITIONS

[No additional provisions are required. Additional definitions are added in the chapters where they apply]

CHAPTER 3
USE AND OCCUPANCY CLASSIFICATION

SECTION 302
CLASSIFICATION

[Revise Section 302.1 as follows:]

302.1 General. Structures or portions of structures shall be classified with respect to occupancy in one or more of the groups listed below. Buildings designed and constructed in accordance with this code shall include the designation (–HP) after the classification.

(No change to remainder of section)

SECTION 302
CLASSIFICATION

C302.1 General. Similar to Section 111.2, which stipulates that an identifier (-HP) be added to the occupancy group on the Certificate of Occupancy. This provision distinguishes buildings constructed under this code and provides a visual notification for fire and maintenance inspectors.

Maintaining the high performance features of structures, as built in accordance with this code, is critical to the resiliency and sustainability of the structure and community as well as the impact on the environment. This designation can be used with the current IBC classification system to assist jurisdictions in keeping track of the resilient sustainable building stock as well as fire safety and maintenance inspections.

CHAPTER 4
SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

SECTION 403
HIGH RISE BUILDINGS

[Revise Section 403.2.1.2 as follows:]

~~**403.2.1.2 Shaft enclosures.** For buildings not greater than 420 feet (128 m) in height, the required fire-resistance rating of the fire barriers enclosing vertical shafts, other than exit enclosures and elevator hoistway enclosures, shall be reduced to 1 hour where automatic sprinklers are installed within the shafts at the top and at alternate floor levels.~~

HIGH PERFORMANCE FIRE SAFETY. Throughout the *International Building Code (*as well as other building codes), fire resistance ratings, egress widths, travel distance and many other safety features are relaxed or completely eliminated due to the presence of an automatic sprinkler system. In addition, where automatic sprinkler systems are installed the building height is allowed to be increased by 1 story and areas increased by 200 to 300 percent. While these systems have a good record in controlling fire and allowing escape, they are still vulnerable to human factors. Combined active and passive protection is necessary to achieve the level of property protection that is appropriate for sustainable buildings. National Fire Protection Association (NFPA) states that sprinkler failure rates, called accidental fire events, are at best currently over 10 percent. These statistics do not include instances when the system was shut off either intentionally or by accident. Permitting sprinkler trade-offs for fire safety, structural integrity and egress, raises the potential for death, injury, facility shutdown, repair construction, worker displacement and other hindrances to efficient facility operations. If a sprinkler malfunction or failure occurs, building elements that have been allowed a reduction in hourly ratings are the only immediate defense remaining to contain or stop the spread of fire. The resiliency of high performance buildings depends on both active suppression and passive compartmentation without allowable hourly reductions, to reasonably guarantee that fire does not spread past the area or room of origin.

SECTION 403
HIGH RISE BUILDINGS

C403.2.1.2 Shaft enclosures. The minimum code permits the fire resistance rating for shafts in high-rise buildings to be reduced by one hour since the building is provided with automatic sprinkler protection. Since all high performance buildings, except Group F-2 (Low Hazard Factories) and S-2 (Low-Hazard Storage Buildings) built under this code, are required to be have sprinklers, there is no reason to allow this tradeoff in safety from fire spread through vertical shafts to continue. This modification removes the exception that allows the one-hour reduction of the required shaft rating in high-rise buildings.

SECTION 404
ATRIUMS

[Revise Exceptions to Section 404.6 as follows:]

404.6 Enclosure of atriums. Atrium spaces.....(No change to text).....in accordance with Section 711, or both.

Exceptions:

1. ~~A glass wall forming a smoke partition where automatic sprinklers are spaced 6 feet (1829 mm) or less along both sides of the separation wall, or on the room side only if there is not a walkway on the atrium side, and between 4 inches and 12 inches (102mmand 305 mm) away from the glass and designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction. The glass shall be installed in a gasketed frame so that the framing system deflects without breaking (loading) the glass before the sprinkler system~~ operates.

~~2~~1. A glass-block wall assembly in accordance with Section 2110 and having a 3/4-hour fire protection rating.

~~3~~2. The adjacent spaces of any three floors of the atrium shall not be required to be separated from the atrium where such spaces are included in the design of the smoke control system.

SECTION 404
ATRIUMS

C404.6 Enclosure of atriums. Removes an exception to allow unrated glass to be used as a fire barrier in an atrium when provided with a deluge water curtain. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

Table C406.3.5. Removes the story increases for parking structures with mechanical access when sprinkler systems are installed. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

SECTION 406
MOTOR-VEHICLE-RELATED OCCUPANCIES

[Revise Table 406.3.5 by deleting mechanical access column with story increase for sprinklers]

TABLE 406.3.5

OPEN PARKING GARAGES AREA AND HEIGHT

TYPE OF CONSTRUCTION	AREA PER TIER (square feet)	~~HEIGHT (in tiers)~~		
		~~Ramp Access~~ HEIGHT (in tiers)	~~Mechanical access~~ ~~Automatic Sprinkler System~~	
			~~No~~	~~Yes~~
IA	(No Change to Table Values)	(No Change to Table Values)	~~Unlimited~~	~~Unlimited~~
IB			~~12 Tiers~~	~~18 Tiers~~
IIA			~~10 Tiers~~	~~15 Tiers~~
IIIB			~~8 Tiers~~	~~12 Tiers~~
IV			~~4 Tiers~~	~~4 Tiers~~

SECTION 413
COMBUSTIBLE STORAGE

[Revise Exceptions to Section 413.2 as follows:]

413.2 Attic, under-floor and concealed spaces. Attic, under-floor .....(No change to text).....not less than 1 ¾ inch (45 mm) in thickness.

Exceptions:

~~1. Areas protected by approved automatic sprinkler systems.~~

2. Group R-3 and U occupancies.

[Delete Footnote (b) to Table 414.2.5(1) as follows:]

SECTION 413
COMBUSTIBLE STORAGE

C413.2 Attic, under-floor and concealed spaces. Since the HPBRS provisions require automatic sprinkler protection in most buildings, Exception No. 1 becomes unnecessary and should be deleted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5

Table C414.2.5(1). The HPBRS provisions require automatic sprinkler protection in all Group M and S-1 occupancies therefore Footnote "b" becomes unnecessary and is shown deleted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5

[F] TABLE 414.2.5(1)
MAXIMUM ALLOWABLE QUANTITY PER INDOOR AND OUTDOOR CONTROL AREA IN GROUP M AND S OCCUPANCIES
NONFLAMMABLE SOLIDS AND NONFLAMMABLE AND NONCOMBUSTIBLE LIQUIDS [d,e,f]

CONDITION		MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
Material[a]	Class	Solids pounds	Liquids gallons
A. Health-hazard materials—nonflammable and noncombustible solids and liquids			
1. Corrosives[~~b~~, c]	(No change to table values)		
2. Highly toxics	Not Applicable	20[~~b~~, c]	2[~~b~~, c]
3. Toxics[~~b~~, c]	(No change to table values)		
B. Physical-hazard materials—nonflammable and noncombustible solids and liquids			
1. Oxidizers[~~b~~, c]	4	(No change to table values)	
	3		
	2		
	1		
2. Unstable (reactives)[~~b~~, c]	4	(No change to table values)	
	3		
	2		
	1		
3. Water (reactives)	3[~~b~~, c]	(No change to table values)	
	2[~~b~~, c]		
	1		

a. Hazard categories are as specified in the *International Fire Code*.
b. ~~Maximum allowable quantities shall be increased 100 percent in buildings that are sprinklered in accordance with Section 903.3.1.1. When Note c also applies, the increase for both notes shall be applied accumulatively.~~
c. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, in accordance with the *International Fire Code*. When Note b also applies, the increase for both notes shall be applied accumulatively.
d. See Table 414.2.2 for design and number of control areas.
e. Allowable quantities for other hazardous material categories shall be in accordance with Section 307.
f. Maximum quantities shall be increased 100 percent in outdoor control areas.
g. Maximum amounts are permitted to be increased to 2,250 pounds when individual packages are in the original sealed containers from the manufacturer or packager and do not exceed 10 pounds each.
h. Maximum amounts are permitted to be increased to 4,500 pounds when individual packages are in the original sealed containers from the manufacturer or packager and do not exceed 10 pounds each.
i. The permitted quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
j. Quantities are unlimited in an outdoor control area.

[Revise Section 423.1 as follows and add new Section 423.2:]

SECTION 423
STORM SHELTERS

423.1 General. In addition to other applicable requirements in this code, storm shelters ~~shall be~~ constructed in accordance with ICC/NSSA-500 shall be provided in accordance with Section 423.3.

423.3 Storm shelters required. Storm shelters shall be provided for occupants of buildings in accordance with Sections 423.3.1 and 423.3.2.

423.3.1 Hurricane shelters. In hurricane-prone regions as defined in Section 1609.2, hurricane shelters shall be provided for occupants of buildings assigned to Group A-3 (community halls, gymnasiums and libraries), E, B (civic administration), I-1, I-2, I-3, R-1 (hotels and motels), R-2, R-3 or R-4, and buildings assigned to Occupancy Category IV in accordance with Section 1604.5.

423.3.2 Tornado shelters. In areas where the shelter design wind speed for tornadoes of Figure 423.1 is 160 mph or greater, tornado shelters shall be provided for occupants of buildings.

423.4 Combined hurricane and tornado shelters. Combined hurricane and tornado shelters shall comply with the more stringent requirements of ICC/NSSA-500 for both types of shelters.

SECTION 423
STORM SHELETERS

C423.1 General. The 2009 *International Building Code* includes a new section that introduces a newly developed ICC standard (ICC/NSSA 500, *Standard on the Design and Construction of Storm Shelters*) for proper construction of storm shelters. However, the new code provisions do not specify where storm shelter provisions are required. It simply states that if a storm shelter is to be constructed then it must follow the requirements in the standard. The provisions in the HPBRS go further by adding a new section (423.3) to specify what types of occupancies shall have storm shelters and in which regions they will be required. Specifying which buildings and where storm shelters are required provides a higher degree of protection to the residents of a community and increases the likelihood that the important buildings remain usable after a high wind event and that minimal reconstruction is required.

C423.3 Storm Shelters Required. Distinguishes requirements for storm shelters in regions prone to hurricanes and those prone to tornadoes.

Hurricane prone regions are defined in Section 1609.2 of the code and generally cover developable areas along the Atlantic and Gulf coasts of the continental United States extending inland where wind speed areas of 90 mph or greater are possible. In addition, hurricane prone regions include the islands of Hawaii, Puerto Rico, Guam, Virgin Islands and American Samoa. The HPBRS provisions require storm shelters in buildings that are typically depended upon to protect the public evacuating the coastal communities and barrier islands (e.g., community halls, gymnasiums, libraries, hotels and motels) and essential facilities used by emergency personnel to respond to high wind events (e.g., hospitals, fire stations, police stations, public utilities) or protect persons unable to evacuate (e.g., hospitals, nursing homes, assisted living, etc.).

Tornado prone regions are established by the storm shelter design wind speed map used in ICC 500 and reprinted in this code for ease of use. Storm shelters are required in all buildings that are constructed in areas where the shelter design wind speed is 160 mph or greater.

CHAPTER 5
GENERAL BUILDING HEIGHTS AND AREAS

SECTION 503
GENERAL HEIGHT AND AREA LIMITATIONS

Modify Table 503 as follows and delete all instances where Type IIB, IIIB or VB construction occur within the code. (Not shown for brevity:]

CTABLE C503 ALLOWABLE BUILDING HEIGHT AND AREAS. The height and area tables are modified to improve fire safety in high performance buildings by requiring the buildings to have at least a 1-hour fire resistance rating for the structural elements of the building. This reduces the risk of damage or collapse of the building due to a fire within.

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]

Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per story

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	~~B~~	A	~~B~~	HT	A	~~B~~
GROUP	HGT (feet) HGT(S)	UL	160	65	~~55~~	65	~~55~~	65	50	~~40~~
A-1	S	NO CHANGE TO TABLE VALUES	NO CHANGE TO TABLE VALUES	NO CHANGE TO TABLE VALUES	~~2~~	NO CHANGE TO TABLE VALUES	~~2~~	NO CHANGE TO TABLE VALUES	NO CHANGE TO TABLE VALUES	~~1~~
	A				~~8,500~~		~~8,500~~			~~5,500~~
A-2	S				~~2~~		~~2~~			~~1~~
	A				~~9,500~~		~~9,500~~			~~6,000~~
A-3	S				~~2~~		~~2~~			~~1~~
	A				~~9,500~~		~~9,500~~			~~6,000~~
A-4	S				~~2~~		~~2~~			~~1~~
	A				~~9,500~~		~~9,500~~			~~6,000~~
A-5	S				~~UL~~		~~UL~~			~~UL~~
	A				~~UL~~		~~UL~~			~~UL~~
B	S				~~3~~		~~3~~			~~2~~
	A				~~23,000~~		~~19,000~~			~~9,000~~
E	S				~~2~~		~~2~~			~~1~~
	A				~~14,500~~		~~14,500~~			~~9,500~~
F-1	S				~~2~~		~~2~~			~~1~~
	A				~~15,500~~		~~12,000~~			~~8,500~~
F-2	S				~~3~~		~~3~~			~~2~~
	A				~~23,000~~		~~18,000~~			~~13,000~~
H-1	S				~~1~~		~~1~~			~~NP~~
	A				~~7,000~~		~~7,000~~			~~NP~~
H-2[d]	S				~~1~~		~~1~~			~~1~~
	A				~~7,000~~		~~7,000~~			~~3,000~~
H-3[d]	S				~~2~~		~~2~~			~~1~~
	A				~~14,000~~		~~13,000~~			~~5,000~~
H-4	S				~~3~~		~~3~~			~~2~~
	A				~~17,500~~		~~17,500~~			~~6,500~~
H-5	S				~~3~~		~~3~~			~~2~~
	A				~~23,000~~		~~19,000~~			~~9,000~~
I-1	S				~~3~~		~~3~~			~~2~~
	A				~~10,000~~		~~10,000~~			~~4,500~~
I-2	S				~~1~~		~~NP~~			~~NP~~
	A				~~11,000~~		~~NP~~			~~NP~~
I-3	S				~~1~~		~~1~~			~~1~~
	A				~~10,000~~		~~7,500~~			~~5,000~~
I-4	S				~~2~~		~~2~~			~~1~~
	A				~~13,000~~		~~13,000~~			~~9,000~~
M	S				2		~~2~~			~~1~~
	A				~~12,500~~		~~12,500~~			~~9,000~~
R-1	S				~~4~~		~~4~~			~~2~~
	A				~~16,000~~		~~16,000~~			~~7,000~~
R-2	S				~~4~~		~~4~~			~~2~~
	A				~~16,000~~		~~16,000~~			~~7,000~~
R-3	S				~~4~~		~~4~~			~~3~~
	A				~~UL~~		~~UL~~			~~UL~~
R-4	S				~~4~~		~~4~~			~~2~~
	A				~~16,000~~		~~16,000~~			~~7,000~~
S-1	S				~~3~~		~~3~~			~~1~~
	A				~~17,500~~		~~17,500~~			~~9,000~~
S-2[b, c]	S				~~4~~		~~4~~			~~2~~
	A				~~26,000~~		~~26,000~~			~~13,500~~
U[c]	S				~~2~~		~~2~~			~~1~~
	A				~~8,500~~		~~8,500~~			~~5,500~~

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.
UL = Unlimited, NP = Not permitted.

a. See the following sections for general exceptions to Table 503:
   ~~1. Section 504.2, Allowable height increase due to automatic sprinkler system installation.~~
   2. Section 506.2, Allowable area increase due to street frontage.
   ~~3. Section 506.3, Allowable area increase due to automatic sprinkler system installation.~~
   4. Section 507, Unlimited area buildings.
b. For open parking structures, see Section 406.3.
c. For private garages, see Section 406.1.
d. See Section 415.5 for limitations.

SECTION 504
HEIGHT

[Delete Section 504.2 as follows:]

504.2 Automatic sprinkler system increase. Where ~~a~~ an F-2 or S-2 occupancy building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one. These increases are permitted in addition to the area increase in accordance with Sections 506.2 and 506.3. ~~For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one, but shall not exceed 60 feet (18 288 mm) or four stories, respectively.~~

~~**Exceptions:**~~

~~1. Fire areas with an occupancy in Group I-2 of Type IIB, III, IV or V construction.~~

~~2. Fire areas with an occupancy in Group H-1, H-2, H-3 or H-5.~~

~~3. Fire resistance rating substitution in accordance with Table 601, Note e~~

SECTION 504
HEIGHT

C504.2 Automatic sprinkler system increase. The HPBRS provisions require all buildings except F-2 occupancies to be sprinklered. The provisions do allow sprinklers to be omitted from some S-2 occupancy buildings associated with an F-2 occupancy. In those cases where automatic sprinkler systems are provided the F-2 and S-2 buildings are permitted an increase in building height and story height for the added protection from the automatic sprinkler system.

SECTION 505
MEZZANINES

[Revise Exception 5 to Section 505.4 as follows:]

505.4 Openness. A mezzanine shall be open and unobstructed to the room in which such mezzanine is located except for walls not more than 42 inches (1067 mm) high, columns and posts.

Exceptions:

(No change to Exceptions 1-4)

5. In occupancies other than Groups F-2, S-2, H and I that are no more than two stories in height above grade plane, and all F-2 and S-2 occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, a mezzanine having two or more means of egress shall not be required to be open to the room in which the mezzanine is located.

SECTION 505
MEZZANINES

C505.4 Openness. Exception No. 5 is revised to reflect that all buildings except F-2 occupancies, and in some cases S-2 occupancies, are required to be sprinklered and can therefore have mezzanines with two means of egress without opening into the room where they are located. Where an automatic sprinkler system is provided in an F-2 and in some cases S-2 occupancies, the enclosed mezzanine with two means of egress is also permitted.

SECTION 506
BUILDING AREA MODIFICATIONS

[Revise Section 506.3 as follows:]

~~**506.3 Automatic sprinkler system increase.** Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the area limitation in Table 503 is permitted to be increased by an additional 200 percent (*Is* = 2) for buildings with more than one story above grade plane and an additional 300 percent (*Is* = 3) for buildings with no more than one story above grade plane. These increases are permitted in addition to the height and story increases in accordance with Section 504.2.~~

~~**Exception:** The area limitation increases shall not be permitted for the following conditions:~~

~~1. The automatic sprinkler system increase shall not apply to buildings with an occupancy in Use Group H-1.~~

~~2. The automatic sprinkler system increase shall not apply to the floor area of an occupancy in Use Group H-2 or H-3. For mixed use buildings containing such occupancies, the allowable area shall be calculated in accordance with Section 508.3.3.2, with the sprinkler increase applicable only to the portions of the building not classified as Use Group H-2 or H-3.~~

~~3. Fire resistance rating substitution in accordance with Table 601, Note e.~~

[Delete Exception 2 to Section 506.4.1]

506.4.1 Area determination. The total allowable building area.....(No change to text or items 1 and 3).

Exceptions:

1. Unlimited area buildings in accordance with Section 507.

2. The maximum area of an F-2 or S-2 occupancy building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.2 shall be determined by multiplying the allowable area per story *(Aa)*, as determined in Section 506.1, by the number of stories above grade plane.

SECTION 506
BUILDING AREA MODIFICATIONS

C506.3 Automatic sprinkler system increase. Removes area increases based on providing an automatic sprinkler system. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

C506.4.1 Area determination. Exception No. 2 is revised to reflect that all buildings except F-2 occupancies, and in some cases S-2 occupancies, are required to be sprinklered and therefore do not qualify for a larger allowable building area in a single story. F-2 and S-2 occupancy buildings with automatic sprinkler protection however are permitted this increase for the added sprinkler protection.

SECTION 507
UNLIMITED AREA BUILDINGS

[Revise Section 507.2 as follows:]

507.2 Nonsprinklered, one story. The area of a ~~one-story~~, Group F-2 or S-2 building no more than one story in height shall not be limited when the building is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

[Revise Section 507.3 as follows:]

507.3 Sprinklered, one story. The area of a Group B, F, M, S, of Type I or II construction ~~no more than one *story* above *grade plane*, or a Group A-4 building no more than one *story* above *grade plane* of other than Type V construction,~~ shall not be limited when ~~the building is provided with an *automatic sprinkler system* throughout in accordance with Section 903.3.1.1 and~~ is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width and where the maximum allowable floor area per sprinkler riser, in accordance with NFPA 13 Section 5.2, is separated with fire barriers having a fire resistance rating in accordance with Table 707.3.9

Exceptions: (No change to Exceptions 1 and 2)

[Revise Section 507.3.1 as follows:]

507.3.1 Mixed occupancy buildings with Groups A-1 and A-2. Group A-1 and A-2 occupancies of ~~other than Type V~~ Types I and II construction shall be permitted within mixed occupancy buildings of unlimited area complying with Section 507.3, provided:

1. Group A-1 and A-2 occupancies are separated from other occupancies as required for separated occupancies in Section 508.4.4 with no reduction allowed in the *fire-resistance rating* of the separation based upon the installation of an *automatic sprinkler system*;
2. Each area of the portions of the building used for Group A-1 or A-2 occupancies shall not exceed the maximum allowable area permitted for such occupancies in Section 503.1; and
3. All exit doors from Group A-1 and A-2 occupancies shall discharge directly to the exterior of the building.

SECTION 507
UNLIMITED AREA BUILDINGS

C507.2 Nonsprinklered, one story. Allows Group F-2 and S-2 occupancy buildings without sprinklers to be of unlimited area. These types of occupancies have low-hazard contents and processes where the risk from fire is low. However, multi-story buildings pose a much higher risk to damage and collapse from a fire. For this reason, this change revises the limitation by restricting the provision to single-story buildings. High performance buildings need to be constructed of higher fire resistant materials if they are to be more than one story and of unlimited area.

C507.3 Sprinklered one story. Modifies the existing code to further require that the construction type is limited to Type I or II and that fire barriers are required to separate the building into areas less than or equal to the maximum sprinkler riser coverage based on the hazard of the sprinkler system.

Providing passive separation between the areas covered by individual sprinkler risers will greatly increase the compartmentation within unlimited area buildings and therefore mitigate fire spread. If the sprinkler system is overrun by a rapid spreading fire, the damage will be contained within the area of origin and mitigate additional loss. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

C507.3.1 Mixed occupancy buildings with Group A-1 and A-2. This section was revised to correlate with the revisions to section 507.3.

[Revise Section 507.4 as follows:]

~~**507.4 Two story.** The area of a two-story, Group B, F, M or S building shall not be limited when the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.~~

C507.4 Two-story. The present code permits two-story Group B, F, M and S buildings to be of unlimited area provided they have 60 feet of open space and are fully sprinklered. This change removes the two-story unlimited area building option from this code. Multi-story buildings pose a much higher risk to damage and collapse from a fire. High performance buildings need to be constructed of higher fire resistant materials if they are to be more than one story and of unlimited area.

[Renumber Section 507.5 to 507.4 and revise as follows:]

507.~~5~~ 4 Reduced open space. The permanent open space of 60 feet (18 288 mm) required in Sections 507.2, 507.3, ~~507.4, 507.6 and 507.10~~ 507.5 and 507.9 shall be permitted to be reduced to not less than 40 feet (12 192 mm), provided the following requirements are met:

1. The reduced open space shall not be allowed for more than 75 percent of the perimeter of the building.
2. The exterior wall facing the reduced open space shall have a minimum fire-resistance rating of 3 hours.
3. Openings in the exterior wall facing the reduced open space shall have opening protectives with a minimum fire protection rating of 3 hours.

[Renumber Section 507.6 to 507.5 and delete Item 2 as follows:]

507.~~6~~ 5 Group A-3 buildings. The area of a one-story, Group A-3 building used as a place of religious worship, community hall, dance hall, exhibition hall, gymnasium, lecture hall, indoor swimming pool or tennis court of Type II construction shall not be limited when all of the following criteria are met:

C507.5 Group A-3 Buildings. Item No. 2 is removed from the list of requirements since the HPBRS provisions require all A-3 occupancy buildings to be provided with an automatic sprinkler system.

1. The building shall not have a stage other than a platform.
2. ~~The building shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~
3. The assembly floor shall be located at or within 21 inches (533 mm) of street or grade level and all exits are provided with ramps complying with Section 1010.1 to the street or grade level.
4. The building shall be surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

[Renumber Section 507.7 to 507.6 and revise as follows:]

507.~~7~~ 6 Group H occupancies. Group H-2, H-3 and H-4 occupancies shall be permitted in unlimited area buildings containing Group F and S occupancies, in accordance with Sections 507.3 and 507.4 and the limitations of this section. The aggregate floor area of the Group H occupancies located at the perimeter of the unlimited area building shall not exceed 10 percent of the area of the building nor the area limitations for the Group H occupancies as specified in Table 503 as modified by Section 506.2, based upon the percentage of the perimeter of each Group H fire area that fronts on a street or other unoccupied space. The aggregate floor area of Group H occupancies not located at the perimeter of the building shall not exceed 25 percent of the area limitations for the Group H occupancies as specified in Table 503. Group H fire areas shall be separated from the rest of the unlimited area building and from each other in accordance with Table 508.3.3 ~~For two-story unlimited area buildings, the Group H fire areas shall not be located above the first story unless permitted by the allowable height in stories and feet as set forth in Table 503 based on the type of construction of the unlimited area building.~~

C507.6 Group H Occupancies. The language is removed from the section since the HPBRS provisions do not permit 2-story unlimited area buildings with deletion of Section 507.4.

[Renumber Sections 507.8 to 507.11 and revise new Sections 507.8 and 507.9 as follows:]

507.~~9~~ 8 Group E buildings. The area of a one-story Group E building of Type II, IIIA or IV construction shall not be limited when the following criteria are met:

1. Each classroom shall have not less than two means of egress, with one of the means of egress being a direct exit to the outside of the building complying with Section 1018.

~~2. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

3. The building is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

C507.8 Group E Buildings. Item No. 2 is removed from the list of requirements since the HPBRS provisions require all E occupancy buildings to be provided with an automatic sprinkler system.

507.~~10~~ 9 Motion picture theaters. In buildings of Type II construction, the area of a one-story motion picture theater shall not be limited when the building ~~is provided with an automatic sprinkler system throughout in accordance with Section 903.3.1.1 and is~~ surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

C507.9 Motion Picture theaters. The automatic sprinkler system language is removed from the list of requirements since the HPBRS provisions require all motion picture theater buildings to be provided with automatic sprinkler protection.

SECTION 508
MIXED USE AND OCCUPANCY

[Revise Section 508.2.5 as follows:]

508.2.5 Separation of incidental accessory occupancies. The incidental accessory occupancies listed in Table 508.2.5 shall be separated from the remainder of the building ~~or equipped with an automatic fire-extinguishing system, or both,~~ in accordance with Table 508.2.5.

Exception: Incidental accessory occupancies within and serving a dwelling unit are not required to comply with this section.

508.2.5.1 Fire resistance rated separation. Where Table 508.2.5 specifies a fire-resistance rated separation, the incidental accessory occupancies shall be separated from the remainder of the building by a fire barrier constructed in accordance with Section 706 or a horizontal assembly constructed in accordance with Section 711, or both.

~~**508.2.5.2 Nonfire-resistance rated separation and protection.** Where Table 508.2.5 permits an automatic fire-extinguishing system without a fire barrier, the incidental accessory occupancies shall be separated from the remainder of the building by construction capable of resisting the passage of smoke. The walls shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the fire-resistance-rated floor/ceiling assembly above or fire-resistance-rated roof/ceiling assembly above or to the underside of the floor or roof sheathing, deck or slab above. Doors shall be self- or automatic-closing upon detection of smoke in accordance with Section 715.4.7.3. Doors shall not have air transfer openings and shall not be undercut in excess of the clearance permitted in accordance with NFPA 80.~~

~~**508.2.5.3 Protection.** Where an automatic fire-extinguishing system or an automatic sprinkler system is provided in accordance with Table 508.2.5, only the space occupied by the incidental accessory occupancy need be equipped with such a system.~~

SECTION 508
MIXED USE AND OCCUPANCY

C508.2.5 Separation of incidental accessory occupancies. The language is removed from this section since the HPBRS provisions require buildings where these incidental accessory occupancies may be located to be provided with an automatic sprinkler system.

C508.2.5.2 Non-fire-resistance rated separation and protection. Removes unnecessary language within this code and revises to reflect that the HPBRS provisions require buildings where these incidental accessory occupancies may be located to be provided with an automatic sprinkler system.

C508.2.5.3 Protection. Removes unnecessary language within this code and revises to reflect that the HPBRS provisions require buildings where these incidental accessory occupancies may be located to be provided with an automatic sprinkler system.

[Revise Table 508.2.5 as follows]

TABLE 508.2.5 INCIDENTAL USE AREAS	
ROOM OR AREA	**SEPARATION AND/OR PROTECTION**
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour ~~or provide automatic sprinkler system~~
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour ~~or provide automatic sprinkler system~~
Refrigerant machinery rooms	1 hour ~~or provide automatic sprinkler system~~
Parking garage (Section 406.2)	2 hours; ~~or 1 hour and provide automatic fire-extinguishing system~~
Hydrogen cut-off rooms, not classified as Group H	1-hour in Group B, F, M, S and U occupancies. 2-hour in Group A, E, I and R occupancies.
Incinerator rooms	2 hour ~~or provide automatic sprinkler system~~
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; ~~or 1 hour and provide automatic fire-extinguishing system~~
Laboratories and vocational shops, not classified as Group H, located in Group E or I-2 occupancies	1 hour ~~or provide automatic sprinkler system~~
Laundry rooms over 100 square feet	1 hour ~~or provide automatic sprinkler system~~
Storage rooms over 100 square feet	1 hour ~~or provide automatic sprinkler system~~
Group I-3 cells equipped with padded surfaces	1 hour
Group I-2 waste and linen collection rooms	1 hour
Waste and linen collection rooms over 100 square feet	1 hour ~~or provide automatic sprinkler system~~
Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons, or a lithium-ion capacity of 1,000 pounds (454 Kg) used for facility standby power, emergency power or uninterrupted power supplies	1-hour in Group B, F, M, S and U occupancies. 2-hour in Group A, E, I and R occupancies.
Rooms in non-high-rise buildings containing fire pumps	2 hours; or 1 hour and provide automatic fire extinguishing system throughout the building.
Rooms in high-rise buildings containing fire pumps	2 hours

TABLE C508.2.5 Incidental use areas. This section requires incidental use areas also be separated as indicated in Table 508.2.5. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Revise Exception 2 to Section 508.3.3 as follows]

508.3.3 Separation. No separation is required between nonseparated occupancies.

Exceptions:

2. Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other dwelling or sleeping units and from other occupancies contiguous to them in accordance with the requirements of Section 420 and 707.3.10.

C508.3.3 New Section 707.3.10 provides passive fire-rated compartmentation between residential dwelling and sleeping units. This change correlates Section 508.3.3 with that new section.

[Replace Table 508.4 as follows:]

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

Occupancy	A[d], E	B	I	R[c]	F-2, S-2[b,c], U[b]	F-1, S-1, M	H-1	H-2	H-3, H-4, H-5
A[d], E[d]	2	2	2	2	1	2	NP	4	3
B	—	N	2	2	1	2	NP	3	2
I	—	—	N		2	2	NP	NP	NP
R[c]	—	—	—	N	2	2	NP	NP	NP
F-2, S-2[b,c], U[c]	—	—	—	—	2	2	NP	4	3[a]
F-1, S-1, M	—	—	—	—	—	2	NP	3	2[a]
H-1	—	—	—	—	—	—	N	NP	NP
H-2	—	—	—	—	—	—	—	N	1
H-3, H-4, H-5	—	—	—	—	—	—	—	—	1

N = No separation requirement.
NP = Not permitted.
a. For Group H-5 occupancies, see Section 903.2.4.2.
b. Areas used only for private or pleasure vehicles shall be allowed to reduce separation by 1 hour.
c. See Section 406.1.4.
d. Commercial kitchens need not be separated from the restaurant seating areas that they serve.
e. Separation is not required between occupancies of the same classification.
f. For H-5 occupancies, See 415.8.2.2

TABLE C508.4 REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

Table 508.4 shows the fire rated separation that is required for buildings built with mixed occupancies. This replacement table reflects revisions to eliminate the reduction in required hourly fire resistant rating when sprinkler protection is provided. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5. In addition, fire resistance ratings are being required between all mixed occupancy uses to improve fire safety to the occupants and the property contained in a high performance building.

CHAPTER 6
TYPES OF CONSTRUCTION

[Construction Types IIB, IIIB and VB are deleted wherever they occur within the code. In some instances, an entire section may need to be deleted or in most cases just the reference to the deleted construction type should be deleted. This amendment is not shown for brevity]

TYPES OF CONSTRUCTION. This Chapter of the code describes the types of constructed permitted by the code based on non-combustible and combustible materials used. In addition, the user is referred to Table 601 for the fire resistance requirements based on the type of construction desired. Maintaining the structural integrity of building in addition to compartmentalizing the occupied spaces are key components for a high performance building. This assures that any fire event has reduced impact on the rest of the structure and provides safety to the occupants. Mitigating the down time or re-location of businesses and staff after a fire event limits the social and economic impact to the community. The construction types are modified in Table 601 and are considered modified throughout this high performance code by limiting them to construction types with a fire resistance rating (i.e Types IA, IB, IIA, IIIA, IV and VA).

SECTION 602
CONSTRUCTION CLASSIFICATION

[Revise Section 602.4.3 as follows:]

602.4.3 Roof framing. Wood-frame or glued-laminated arches for roof construction, which spring from the floor line or from grade and do not support floor loads, shall have members not less than 6 inches (152 mm) nominal in width and have less than 8 inches (203 mm) nominal in depth for the lower half of the height and not less than 6 inches (152 mm) nominal in depth for the upper half. Framed or glued laminated arches for roof construction that spring from the top of walls or wall abutments, framed timber trusses and other roof framing, which do not support floor loads, shall have members not less than 4 inches (102 mm) nominal in width and not less than 6 inches (152 mm) nominal in depth. Spaced members shall be permitted to be composed of two or more pieces not less than 3 inches (76 mm) nominal in thickness where blocked solidly throughout their intervening spaces or where spaces are tightly closed by a continuous wood cover plate of not less than 2 inches (51 mm) nominal in thickness secured to the underside of the members. Splice plates shall be not less than 3 inches (76 mm) nominal in thickness. ~~Where protected by approved automatic sprinklers under the roof deck, framing members shall be not less than 3 inches (76 mm) nominal in width.~~

SECTION 602
CONSTRUCTION CLASSIFICATION

C602.4.3 Roof framing. The code permits the size of roof members in buildings constructed of heavy timber members (Type IV) to be reduced for sprinklers. This change eliminates the reduction. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Modify Table 601 as follows:]

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (hours)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A[d]	~~B~~	A[d]	~~B~~	HT	A[d]	~~B~~
Primary structural frame[g] (see Section 202)	3[a]	2[a]	1	~~0~~	1	~~0~~	HT	1	~~0~~
Bearing walls									
Exterior[f, g]	3	2	1	~~0~~	2	~~2~~	2	1	~~0~~
Interior	3[a]	2[a]	1	~~0~~	1	~~0~~	1/HT	1	~~0~~
Tenant Separation[h, I, j]	See Table 508.4								
Nonbearing walls and partitions Exterior	See Table 602								
Nonbearing walls and partitions Interior[e]	0	0	0	~~0~~	0	~~0~~	See Section 602.4.6	0	~~0~~
Floor construction and secondary members (see Section 202)	2	2	1	~~0~~	1	~~0~~	HT	1	~~0~~
Roof construction and secondary members (see Section 202)	$1^1/_2$[b]	1[b, c]	1[b, c]	~~0~~[b, c]	1[b, c]	~~0~~[b, c]	HT	1[b, c]	~~0~~

For SI: 1 foot = 304.8 mm.

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

c. In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.

~~d. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1-hour fire-resistance-rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted.~~

e. Not less than the fire-resistance rating required by other sections of this code.

f. Not less than the fire-resistance rating based on fire separation distance (see Table 602).

g. Not less than the fire-resistance rating as referenced in Section 704.10

h. Tenant separations between the same group shall be in accordance with Table 707.3.9

i. Tenant separations in Malls shall comply with section 402

J. Spaces complying with Section 508 shall not be required to be separated.

T601 – Tenant Separation. This revision to Table 601 adds an entry to direct the user of the code to the additional requirements for providing fire rated separations between tenant spaces in residential occupancies and mall buildings that are constructed as high performance buildings.

CHAPTER 7
FIRE-RESISTANCE-RATED CONSTRUCTION

SECTION 705
EXTERIOR WALLS

[Revise Section 705.1 as follows]

705.1 General. Exterior walls shall comply with this section and the *International Wildland-Urban Interface Code*. Fire Hazard Severity shall be based on Table 502.1 in the *International Wildland-Urban Interface Code*.

SECTION 705
EXTERIOR WALLS

C705.1 General. Mandates compliance with the International Wildland Urban Interface Code (IWUIC) and bases fire hazard severity on Table 502.1, rather than Appendix C, Fire Hazard Severity Form.

The IWUIC provides an excellent filter to identify those structures that due to any combination of vegetation type, terrain slope, prevailing wind speed, available water, access and defensible area must provide mitigation requirements based on the extent of vulnerable exposure, while clearly recognizing those structures which do not need any additional protection. The potential of wildland urban interface exists in a large portion of the United States. Much of the focus has been on the wildfires in California, which have caused enormous property loss. Areas all up and down the east coast have very high wildland urban interface densities as well as many other areas of the U.S.

[Replace Table 705.8 as follows]

TABLE 705.8
MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION

FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA[A]
0 to less than 3[b, c]	Unprotected, (UP)	Not Permitted
	Protected (P)	Not Permitted
3 to less than 5[d, e]	Unprotected (UP)	Not Permitted
	Protected (P)	15%
5 to less than 10[e, f]	Unprotected (UP)	10%[h]
	Protected (P)	25%
10 to less than 15[e, f, g]	Unprotected (UP)	15%[h]
	Protected (P)	45%
15 to less than 20[f, g]	Unprotected (UP)	25%
	Protected (P)	75%
20 to less than 25[f, g]	Unprotected (UP)	45%
	Protected (P)	No Limit
25 to less than 30[f, g]	Unprotected (UP)	70%
	Protected (P)	No Limit
30 or greater	Unprotected (UP)	No Limit
	Protected (P)	Not Required

For SI: 1 foot = 304.8 mm.
UP = Unprotected openings in buildings
P = Openings protected with an opening protective assembly in accordance with Section 704.8.2.

a. Values indicated are the percentage of the area of the exterior wall, per story.
b. For the requirements for fire walls of buildings with differing heights, see Section 705.6.1.
c. For openings in a fire wall for buildings on the same lot, see Section 705.8.
d. The maximum percentage of unprotected and protected openings shall be 25 percent for Group R-3 occupancies.
e. Unprotected openings shall not be permitted for openings with a fire separation distance of less than 15 feet for Group H-2 and H-3 occupancies.
f. The area of unprotected and protected openings shall not be limited for Group R-3 occupancies, with a fire separation distance of 5 feet or greater.
g. The area of openings in an open parking structure with a fire separation distance of 10 feet or greater shall not be limited.
h. Includes buildings accessory to Group R-3.
i. Not applicable to Group H-1, H-2 and H-3 occupancies.

CTABLE 705.8. Exterior walls that are required to have a fire resistance rating based on proximity to property lines by Table 602 are also required in Table 705.8 to have limits on the amount of the openings permitted within the walls to prevent the spread of fire between buildings. The code permits the allowable area of the openings to be increased for sprinkler protection. Since most of the high performance buildings are required to be sprinklered the increase in allowable area of openings in the exterior walls is unwarranted. The table in the HPBRS replaces Table 705.8 in the code to limit the size of the openings in high performance buildings.

[Revise Section 705.8.2 as follows:]

705.8.2 Protected openings. Where openings are required to be protected, fire doors and fire shutters shall comply with Section 715.4 and fire window assemblies shall comply with Section 715.5.

~~Exception: Opening protective assemblies are not required where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and the exterior openings are protected by a water curtain using automatic sprinklers approved for that use.~~

C705.8.2 Protected openings. Removes the exception to allow unprotected openings in lieu of protected openings, when the building is provided with sprinkler systems and a water curtain on the outside is provided.

Structures within close proximity are at risk of fire from other buildings due to radiant heat transfer as well as falling debris and burning embers. Adjacent structures are commonly fed from the same water main and thus will have a diminished available water supply to maintain a water curtain deluge design, i.e., due to sprinkler activation and fire hose demand in an adjacent building. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Revise Exception 2 to Section 705.8.5 as follows:]

705.8.5 Vertical separation of openings. Openings in exterior .....(No change to text).....otherwise required by the provisions of this code.

Exceptions:

1. This section shall not apply to buildings that are three stories or less above grade plane.

~~2. This section shall not apply to buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2~~

3. 2. Open parking garages.

C705.8.5 Vertical separation of openings. Removes an exception to allow a trade-off for buildings that provide automatic sprinkler systems. The exception to allow a trade-off for buildings that provide automatic sprinkler systems was removed for two reasons. The first reason is the elimination of unprotected construction types; therefore, all exterior-bearing walls will have a minimum one-hour fire-resistive rating. In any vertically stacked building design of four stories or more, all of the exterior walls (except for possibly the top floor) will be considered bearing and therefore have a minimum one-hour rating. Secondly, vertical spread of fire on combustible exterior walls of sprinklered buildings has occurred during several recent fires and has shown to be very difficult to control, resulting in large property losses, loss of revenue and lost jobs. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Modify Section 705.11, Exception 5 as follows:]

705.11 Parapets. Parapets shall be provided on exterior walls of buildings.

Exceptions: (No change to Exceptions 1 to 3 and Exception 6)

4. One-hour fire-resistance-rated *exterior walls* constructed of non-combustible materials that terminate at the underside of the roof sheathing, deck or slab, provided:

(No change to Items 4.1 through 4.4)

5. In Groups ~~R-2 and~~ R-3 where the entire building is provided with a Class C roof covering, the exterior wall shall be permitted to terminate at the underside of the roof sheathing or deck in Type III, IV and V construction, provided:

C705.11. Parapets. The code requires parapets on the exterior walls to minimize the spread of fire from the building to adjacent properties. There are numerous exceptions where the parapet can be eliminated when the threat of fire spread is reduced by incorporating other fire safety features such as increasing the distance from the building exterior wall to the property line or utilizing fire resistive construction and non-combustible materials for the construction of the building. These changes are to incorporate the high performance requirements into the code by eliminating the reduction permitted for sprinkler protection and not permitting the elimination of parapets for multifamily dwellings (Group R-2 occupancies).

[Revise Exception to Section 705.12 as follows]

705.12 Opening protection. Windows in exterior walls .....(No change to text).....or 704.8 shall comply with Section 715.4.

Exception: Opening protectives are not required where ~~the building is protected throughout by an automatic~~

C705.12 Opening protection. Removes the exception to allow unprotected openings in lieu of protected openings when the building is provided with sprinkler systems and a water curtain on the outside.

~~sprinkler system and~~ the exterior openings are protected by an approved water curtain using automatic sprinklers approved for that use. The ~~sprinklers and the~~ water curtain shall be installed in accordance with Section 903.3.1.1 and shall have an automatic water supply and fire department connection

Structures within close proximity are at risk of fire from other buildings due to radiant heat transfer as well as falling debris and burning embers. Adjacent structures are commonly fed from the same water main and thus will have a diminished available water supply to maintain a water curtain deluge design, i.e., due to sprinkler activation and fire hose demand in an adjacent building. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

SECTION 706
FIRE WALLS

SECTION 706
FIRE WALLS

[Revise Section 706.3 and delete Footnote (a) to Table 706.4 as follows]

706.3 Materials. Fire walls shall be of any approved noncombustible material permitted in NFPA 221. . ~~materials.~~

~~**Exception:** Building of Type V construction~~.

C706.3 Materials. Removes an exception to allow Type V construction to be permitted to have combustible fire walls. After significant fire events, fire walls involved with fire for two hours and constructed of combustible material typically need to be removed and replaced. Non-combustible fire walls, especially masonry and concrete, can sustain fire exposure or be easily repaired in place without replacement.

TABLE 706.4
FIRE WALL FIRE-RESISTANCE RATINGS

GROUP	FIRE-RESISTANCE RATING (hours)
A, B, E, H-4, I, R-1, R-2, U	3[a]
F-1, H-3b, H-5, M, S-1	3
H-1, H-2	4
F-2, S-2, R-3, R-4	2[a]

~~a. Walls shall be not less than 2-hour fire-resistance rated where separating buildings of Type II or V construction.~~

~~b.~~ a. For Group H-1, H-2 or H-3 buildings, also see Sections 415.4 and 415.5.

TABLE C706.4 FIRE WALL FIRE-RESISTANCE RATINGS. Removes the footnote in Table 706.4 that permits buildings of Type II and V construction to reduce the fire resistance rating for fire walls from 3-hours to 2-hours. The resilience of a building is enhanced by reducing the risk from fire spread when the fire walls are required to have a 3-hour fire resistance rating, especially in Type V construction.

[Revise Exception 3 to Section 706.5 as follows]

706.5 Horizontal continuity. Fire walls.....(No change to text).....of exterior walls.

Exceptions:

(No change to Exception 1 and 2)

~~3. Fire walls shall be permitted to terminate at the interior surface of noncombustible exterior sheathing where the building on each side of the fire wall is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

C706.5 Horizontal continuity. Removes Exception #3, which exempts 18-inch extensions of the fire walls when automatic sprinklers are installed. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Delete Exception 2 to Section 706.8 as follows]

706.8 Openings. Each opening.....(No change to text).....of the length of the wall.

Exception:

1. Openings are not permitted in party walls constructed in accordance with Section 705.1.1.
2. ~~Openings shall not be limited to 120 square feet (11 m2) where both buildings are equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.~~

C706.8 Openings. Removes Exception #2 permitting openings in fire walls to be greater than 156 square feet when the building is provided with an automatic sprinkler.

SECTION 707
FIRE BARRIERS

[Add new Section 707.3.10 as follows:]

707.3.10 Separation of dwelling units and sleeping units. The fire-resistance rating of the separation between individual dwelling units and sleeping units, and between dwelling units and sleeping units and other spaces in the building shall comply with Table 707.3.9.

SECTION 707
FIRE BARRIERS

C707.3.10 Separation of dwelling units and sleeping units. Requires a two-hour separation between dwelling units and sleeping units as well as hourly separation between other occupancies.

New Section 707.3.10 provides passive fire-rated compartmentation between residential dwelling and sleeping units. This coupled with sprinkler protection throughout will provide residents with an area of refuge within their own dwelling units in case fire blocks their egress path from the building. This is especially important for dwellings housing the aging population. In addition, these fire barriers between dwelling units helps contain the fire to the room of origin minimizing damage to other parts of the building which improves the likelihood the facility will remain in operation and reduce the need for the displacement of residents.

[Delete Exception 1 to Section 707.6 as follows]

707.6 Openings. Openings in a fire barrier.....(No change to text).....and 1021.4, respectively.

Exceptions:

1. ~~Openings shall not be limited to 156 square feet (15 m^2) where adjoining floor areas are equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

(Renumber Exceptions 2 though 5)

C707.7 Openings. Removes Exception #1 permitting openings in fire barriers to be greater than 156 square feet when the building is provided with an automatic sprinkler. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

SECTION 708
SHAFT ENCLOSURES

[Revise Exception 2 to Section 708.2 as follows]

708.2 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this Section.

SECTION 708
SHAFT ENCLOSURES

C708.2.4 Shaft enclosure required. Exception No. 2 is revised to reflect that all buildings except F-2 occupancies, and in some cases S-2 occupancies, are required to be sprinklered and

Exceptions:

1. A shaft enclosure is not required for openings totally within an individual residential dwelling unit and connecting four stories or less.

2. A shaft enclosure is not required in an F-2 or S-2 occupancy building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.2 for an escalator or stairway that is not a portion of the means of egress protected in accordance with Items 2.1 or 2.2.

   (No change to Items 2.1 and 2.2)

   (No change to Exceptions 3 through 14)

[Revise Exceptions 1, 4, 5 and 6 to Section 708.14.1 as follows]

708.14.1 Elevator lobby. An enclosed elevator lobby .....(No change to text).....and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the street floor~~, provided the entire street floor is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1~~.

2. Elevators not required to be located in a shaft in accordance with Section 707.2 are not required to have enclosed elevator lobbies.

3. Where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.

4. In other than Group I-3, and buildings having occupied floors located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access~~, enclosed elevator lobbies are not required where the building is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2~~.

~~5. Smoke partitions shall be permitted in lieu of fire partitions to separate the elevator lobby at each floor where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

~~6.~~ 5. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 707.14.2.

therefore do not qualify for elimination of the requirement for a shaft enclosure for escalator or stair enclsoures in sprinklered buildings. F-2 and S-2 occupancy buildings with automatic sprinkler protection however are permitted reduction when automatic sprinkler protection is added.

C708.14.1. Elevator lobby. The revisions to Exceptions 1, 4 and 5 for elevator lobbies are based on the premise that most high performance buildings with occupancies where the elevator lobbies are required will also be provided with automatic sprinkler protection systems and the exceptions for elevator lobbies due to sprinkler protection are not warranted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

SECTION 709
FIRE PARTITIONS

[Revise Sections 709.1, 709.3 and 709.4 as follows]

709.1 General. The following wall assemblies shall comply with this section.

~~1. Walls separating dwelling units in the same building as required by Section 419.2.~~

~~2. Walls separating sleeping units as required by Section 419.2.~~

~~3.~~ 1. Walls separating tenant spaces in covered mall buildings as required by Section 402.7.2.

~~4.~~ 2. Corridor walls as required by Section 1017.1.

~~5.~~ 3. Elevator lobby separation as required by Section 707.14.1

709.3 Fire-resistance rating. Fire partitions shall have a fire-resistance rating of not less than 1 hour.

Exceptions:

~~1. Corridor walls as permitted by Table 1017.1.~~

~~2. Dwelling and sleeping unit separations in buildings of Type IIB, IIIB and VB construction shall have fire-resistance ratings of not less than 1/2 hour in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

709.4 Continuity. Fire partitions shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above or to the fire-resistance-rated floor/ceiling or roof/ceiling assembly above, and shall be securely attached thereto. If the partitions are not continuous to the sheathing, deck or slab, and where constructed of combustible construction, the space between the ceiling and the sheathing, deck or slab above shall be fireblocked or draftstopped in accordance with Sections 717.2 and 717.3 at the partition line. The supporting construction shall be protected to afford the required fire-resistance rating of the wall supported, except for tenant ~~and sleeping unit separation walls~~ and corridor walls in buildings of Types IIB, IIIB and VB construction.

Exceptions:

(No change to Items 1 through 5)

~~6. Fireblocking or draftstopping is not required at the partition line in buildings equipped with an automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2, provided that auto-~~

SECTION 709
FIRE PARTITIONS

C709.1 General. Requires that walls separating dwelling and sleeping units must be fire barriers in accordance with 707.3.10.l. Fire barriers have a higher degree of reliability to perform during a fire event than fire partitions.

Passive fire-rated non-combustible compartmentation between residential dwelling and sleeping units coupled with sprinkler protection throughout will provide residents with an area of refuge within their own unit. The containment of fire to the room of origin will allow the facility to remain in operation and eliminate the displacement of residents from the facility.

C709.3 Fire-resistance rating. Removes Exceptions #1 and #2 permitting corridors and dwelling and sleeping units to be less than a one-hour rating. All corridors serving an occupant load greater than ten are required to be rated one-hour.

Passive fire-rated non-combustible compartmentation between residential dwelling and sleeping units coupled with sprinkler protection throughout will provide residents with an area of refuge within their own unit. The containment of fire to the room of origin will allow the facility to remain in operation and eliminate the displacement of residents from the facility

C709.4. Continuity. The revision to Exception 6 for continuity of fire partitions is based on the premise that most high performance buildings with occupancies where this applies will also be provided with automatic sprinkler protection systems and the exception fire blocking or draftstopping due to sprinkler protection is not warranted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

~~matic sprinklers are installed in combustible floor/ceiling and roof/ceiling spaces.~~

SECTION 712
HORIZONTAL ASSEMBLIES

[Revise Section 712.3 as follows]

712.3 Fire-resistance rating. The fire-resistance rating of floor and roof assemblies shall not be less than that required by the building type of construction. Where the floor assembly separates mixed occupancies, the assembly shall have a fire-resistance rating of not less than that required by Section 508.3.2 based on the occupancies being separated. Where the floor assembly separates a single occupancy into different fire areas, the assembly shall have a fire-resistance rating of not less than that required by Section 706.3.9. Horizontal assemblies separating dwelling units in the same building and horizontal assemblies separating sleeping units in occupancies in the same building shall ~~be a minimum of~~ have a 1-hour fire-resistance-rated construction as required in Section 707.3.10.

~~**Exception:** Dwelling unit and sleeping unit separations in buildings of Type IIB, IIIB, and VB construction shall have fire-resistance ratings of not less than 1/2 hour in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

SECTION 712
HORIZONTAL ASSEMBLIES

C712.3 Fire-resistance rating. Removes unnecessary language within this code to reflect those construction types do not exist in a high performance building code.

SECTION 715
OPENING PROTECTIVES

[Delete Exception to Section 715.4.4 as follows:]

715.4.4 Doors in exit enclosures and exit passageways. Fire door assemblies.....(No change to text).....standard fire test exposure.

~~Exception: The maximum transmitted temperature rise is not required in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

[Delete Exception to Section 715.4.4.1 as follows:]

715.4.4.1 Glazing in doors. Fire-protection-rated glazing .....(No change to text).....in accordance with Section 715.4.4.

~~Exception: The maximum transmitted temperature rise is not required in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

SECTION 715
OPENING PROTECTIVES

C715.4.4 Doors in exit enclosures and exit passageways. This section requires that fire door assemblies in exit enclosures and exit passageways shall have a maximum transmitted temperature end point of not more than 450° F (250° C) above ambient at the end of 30 minutes of standard fire test exposure. The exception to this section was removed to reflect that all buildings, other than Groups F-2 and S-2, under this code are required to be provided with sprinkler protection. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

C715.4.4.1 Glazing in doors. This section requires fire-protection-rated glazing in excess of 100 square inches (0.065 m^2) shall be permitted in fire door assemblies when tested as components of the door assemblies and not as glass lights, and shall have a maximum transmitted temperature rise of 450°F (250°C) in accordance with Section 715.4.4. The exception to this section was removed to reflect that all buildings, other than Groups F-2 and S-2, under this code are required to be provided with sprinkler protection. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

SECTION 716
DUCT AND AIR TRANSFER OPENINGS

[Modify Section 716.5.2 as follows:]

716.5.2 Fire barriers. Ducts and air transfer openings .....(No change to text).....of a smoke control system.

Such walls are penetrated by ducted HVAC systems, have a required fire-resistance rating of 1 hour or less, and are in areas of other than Group H ~~and are in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.~~ For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.

[Modify Exception 1 to Section 716.5.4 as follows:]

716.5.4 Fire partitions. Ducts and air transfer openings that penetrate fire partitions shall be protected with listed fire dampers installed in accordance with their listing.

Exceptions: In occupancies other than Group H, fire dampers are not required where any of the following apply:

1. The partitions are tenant separation or corridor walls ~~in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and~~ where the duct is protected as a through penetration in accordance with Section 712.

(No change to Items 2 and 3)

SECTION 716
DUCT AND AIR TRANSFER OPENINGS

C716.5.2 Fire barriers. Ducts and air transfer openings of fire barriers typically are required to have fire dampers when penetrating the barrier. This change eliminates unnecessary language.

C716.5.4 Fire partitions. Ducts and air transfer openings of fire partitions typically are required to have fire dampers when penetrating the partition. This change eliminates unnecessary language.

SECTION 717
CONCEALED SPACES

[Delete Exception 1 and 2 to Section 717.3.2 as follows:]

717.3.2 Groups R-1, R-2, R-3 and R-4. Draftstopping .....(No change to text).....in line with the dwelling unit and sleeping unit separations.

~~**Exceptions:**~~

~~1. Draftstopping is not required in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

~~2. Draftstopping is not required in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.2, provided that automatic sprinklers are also installed in the combustible concealed spaces.~~

SECTION 717
CONCEALED SPACES

C717.3.2 Groups R-1, R-2, R-3 and R-4. Requires draftstopping be provided in floor/ceiling spaces in Group R-1 buildings, in Group R-2 buildings with three or more dwelling units, in Group R-3 buildings with two dwelling units, and in Group R-4 buildings. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Delete Exception to Section 717.3.3 as follows:]

717.3.3 Other groups. In other groups, draftstopping shall be installed so that horizontal floor areas do not exceed 1,000 square feet (93 m2).

~~**Exception:** Draftstopping is not required in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1~~

C717.3.3 Other Groups. Requires that in other groups, draftstopping shall be installed so that horizontal floor areas do not exceed 1,000 square feet (93 m^2). Draftstopping reduces the risk to spread of fire in concealed floor spaces. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Delete Exception 2 to Section 717.4.2 as follows:]

717.4.2 Groups R-1 and R-2. Draftstopping.....(No change to text).....of the roof sheathing above.

Exceptions:

1. Where corridor walls provide a sleeping unit or dwelling unit separation, draftstopping shall only be required above one of the corridor walls.

~~2. Draftstopping is not required in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

(Renumber Items 3 and 4)

C717.4.2 Groups R-1 and R-2. Requires draftstopping be provided in attics, mansards, overhangs or other concealed roof spaces of all Group R-1 buildings and Group R-2 buildings with three or more dwelling units. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Delete Exception to Section 717.4.3 as follows:]

717.4.3 Other groups. Draftstopping shall be installed in attics and concealed roof spaces, such that any horizontal area does not exceed 3,000 square feet (279 m^2).

~~Exception: Draftstopping is not required in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1~~

C717.4.3 Other groups. Requires draftstopping be installed in attics and concealed roof spaces, such that any horizontal area does not exceed 3,000 square feet (279 m^2). Draftstopping reduces the risk to spread of fire in concealed attic spaces. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

CHAPTER 8
INTERIOR FINISHES

INTERIOR FINISHES. This chapter of the building code regulates materials used as interior finishes, trim and decorative materials. In most cases, these provisions are intended to minimize the spread of fire or the effects of burning materials on the building occupants. For a HPBRS there are additional provisions that must be added to minimize the impact of materials on the interior environment and building occupants. This is primarily accomplished by limiting the introduction of volatile organic compounds (VOCs) into the built environment. Four prominent materials that can inadvertently introduce VOCs into the built environment are carpets, adhesives and sealants, paints and coatings, and composite wood-based products. Requirements consistent with those promulgated by the California Department of Health Services, the California Air Resources Board, Green Seal and the US Environmental Protections Agency (US EPA) are included for these products in new sections. They are:

Section 804.5, Carpets

Section 807, Adhesives and Sealants

Section 808, Paints and Coatings

Section 809, Composite Wood, Wood Structural Panel and Agrifiber Products.

Additional changes to improve fire safety and durability to the high performance buildings are also provided.

SECTION 803
WALL AND CEILING FINISHES

[Revise Table 803.5 as follows]

TABLE 803.5
INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY[k]

	~~SPRINKLERED[l]~~			~~NONSPRINKLERED~~		
GROUP	~~Exit Enclosures and Exit passageways[a,b]~~	~~Corridors~~	~~Rooms and Enclosed spaces[e]~~	Exit Enclosures and Exit passageways[a,b]	Corridors	Rooms and Enclosed spaces[c]
A-1, A-2	~~B~~	~~B~~	~~C~~	A	A[d]	B[e]
A-3[f], A-4, A-5	~~B~~	~~B~~	~~C~~	A	A[d]	C
B, E, M, R-1, R-4	~~B~~	~~C~~	~~C~~	A	B	C
F	~~C~~	~~C~~	~~C~~	B	C	C
H	~~B~~	~~B~~	~~C~~	A	A	B
I-1	~~B~~	~~C~~	~~C~~	A	B	B
I-2	~~B~~	~~B~~	~~B[h,i]~~	A	A	B
I-3	~~A~~	~~A[j]~~	~~C~~	A	A	B
I-4	~~B~~	~~B~~	~~B[h,i]~~	A	A	B
R-2	~~C~~	~~C~~	~~C~~	B	B	C
R-3	~~C~~	~~C~~	~~C~~	A	C	C
S	~~C~~	~~C~~	~~C~~	B	B	C
U	~~No Restrictions~~			No Restrictions		

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929m2.

a. Class C interior finish materials shall be permitted for wainscotting or paneling of not more than 1,000 square feet of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked as required by Section 803.1.1.

~~b. In exit enclosures of buildings less than three stories in height of other than Group I-3, Class B interior finish for nonsprinklered buildings and Class C interior finish for sprinklered buildings shall be permitted.~~

b. Requirements for rooms and enclosed spaces shall be based upon spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered enclosing spaces and the rooms or spaces on both sides shall be considered one. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor regardless of the group classification of the building or structure.

c. Lobby areas in Group A-1, A-2 and A-3 occupancies shall not be less than Class B materials.

d. Class C interior finish materials shall be permitted in places of assembly with an occupant load of 300 persons or less.

e. For places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be permitted.

f. Class B material is required where the building exceeds two stories.

g. Class C interior finish materials shall be permitted in administrative spaces.

h. Class C interior finish materials shall be permitted in rooms with a capacity of four persons or less.

i. Class B materials shall be permitted as wainscotting extending not more than 48 inches above the finished floor in corridors.

j. Finish materials as provided for in other sections of this code.

~~l. Applies when the exit enclosures, exit passageways, corridors or rooms and enclosed spaces are protected by a sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

CTABLE 803.5. INTERIOR WALL AND CEILING FINISH. The revisions to Table 803.5 for interior finishes is based on the premise that most high performance buildings with occupancies where this applies will also be provided with automatic sprinkler protection systems and the reduction in flame spread classification index due to sprinkler protection is not warranted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

[Revise Section 803.11.2 as follows:]

803.11.2 Set-out construction. Where walls and ceilings are required to be of fire-resistance-rated or noncombustible construction and walls are set out or ceilings are dropped distances greater than specified in Section 803.11.1, Class A finish materials, in accordance with Section 803.1.1 or 803.1.2, shall be used ~~except where interior finish materials are protected on both sides by an automatic sprinkler system or~~ attached to noncombustible backing or furring strips installed as specified in

C803.11.2 Set-out construction. Requires that where walls and ceilings are required to be of fire-resistance-rated or noncombustible construction, and walls are set-out or ceilings are dropped distances greater than specified in Section 803.11.1, Class A finish materials (in accordance with Section 803.1.1 or 803.1.2) shall be used and attached to noncombustible backing or furring strips installed as specified in Section 803.11.1. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

Section 803.11.1. The hangers and assembly members of such dropped ceilings that are below the main ceiling line shall be of noncombustible materials, except that in Type III and V construction, fire retardant-treated wood shall be permitted. The construction of each set-out wall shall be of fire-resistance-rated construction as required elsewhere in this code.

SECTION 804
INTERIOR FLOOR FINISHES

[Delete Exception to Section 804.4.1 as follows:]

804.4.1 Minimum critical radiant flux. Interior floor finish .....(No change to text).....shall comply with the-DOCFF-1 "pill test" (CPSC 16 CFR, Part 1630).

~~**Exception:** Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, Class II materials are permitted in any area where Class I materials are required, and materials complying with the DOC FF-1 "pill test" (CPSC 16 CFR, Part 1630) are permitted in any area where Class II materials are required.~~

[Add new Section 804.5 as follows:]

804.5 Carpet. Carpet installed in buildings shall be tested in accordance with and not exceed the maximum allowable VOC concentrations of CA/DHS/EHLB/R-174. Carpets shall be labeled to show conformance with the maximum allowable concentrations.

SECTION 806
DECORATIVE MATERIALS AND TRIM

[Revise Exception 1 to Section 806.1.2 as follows:]

[F] 806.1.2 Combustible decorative materials. The permissible amount.....(No change to text).....of walls and ceilings.

Exceptions:

1. In auditoriums in Group A, the permissible amount of decorative material meeting the flame propagation performance criteria of NFPA 701 shall not exceed 50 percent of the aggregate area of walls and ceiling ~~where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and~~ where the material is installed in accordance with Section 803.4.

2. The amount of fabric partitions suspended from the ceiling and not supported by the floor in Group B and M occupancies shall not be limited.

SECTION 804
INTERIOR FLOOR FINISHES

C804.4.1 Minimum critical radiant flux. Requires that interior floor finish and floor covering materials in exit enclosures, exit passageways, and corridors shall not be less than Class I in Groups I-2 and I-3, and not less than Class II in Groups A, B, E, H, I-4, M, R-1, R-2, and S. In all areas, floor covering materials shall comply with the DOCFF-1 "pill test" (CPSC16 CFR, Part 1630). See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

SECTION 806
DECORATIVE MATERIALS AND TRIM

C806.1.2 Combustible decorative materials. Requires that in auditoriums in Group A, the permissible amount of decorative material meeting the flame propagation performance criteria of NFPA 701 shall not exceed 50 percent of the aggregate area of walls and ceiling where the material is installed in accordance with Section 803.4. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Add new Sections 807, 808 and 809 as follows:]

SECTION 807
ADHESIVES AND SEALANTS

807.1 General. All adhesives and sealants used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall comply with the requirements of the ASHRAE 189.1 Section 8.4.2.1.

C807. ADHESIVES AND SEALANTS. See discussion on INTERIOR FINISHES, Chapter 8, Page 30.

SECTION 808
PAINTS AND COATINGS

808.1 General. Paints and coatings used on the interior of the building (defined as inside of the exterior wall weather covering and applied on-site) shall comply with the requirements of the ASHRAE 189.1 Section 8.4.2.2.

C808. PAINTS AND COATINGS. See discussion on INTERIOR FINISHES, Chapter 8, Page 30.

SECTION 809
COMPOSITE WOOD, WOOD STRUCTURAL PANEL, AND AGRIFIBER PRODUCTS

809.1 General. Composite wood, wood structural panel and agrifiber products used on the interior of the building (defined as inside of the exterior wall weather covering) shall comply with the requirements of the ASHRAE 189.1 Section 8.4.2.4.

C809. COMPOSITE WOOD, WOOD STRUCTURAL PANEL, AND AGRIFIBER PRODUCTS. See discussion on INTERIOR FINISHES, Chapter 8, Page 30.

CHAPTER 9
FIRE PROTECTION SYSTEMS

SECTION 903
AUTOMATIC SPRINKLER SYSTEMS

[Modify Section 903.2 as follows and delete sections 903.2.1 through 903.2.13 (not shown for brevity):]

[F] 903.2 Where required. In other than Group F-2 occupancies, approved automatic sprinkler systems ~~in new buildings and structures~~ shall be provided ~~in the locations described in this section~~ throughout all new buildings.

Exceptions:

1. Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided those spaces or areas are equipped throughout with an automatic fire alarm system and are separated from the remainder of the building by fire barriers consisting of not less than 1-hour fire-resistance-rated walls and 2-hour fire-resistance-rated floor/ceiling assemblies.

2. In Group S-2, Storage Occupancies located in close proximity to a Group F-2, Industrial Occupancy where the noncombustible products that are manufactured in the Group F-2 building are stored, the sprinkler protection shall be permitted to be omitted when *approved* by the *building official*.

[Modify to Sections 903.3 and 903.3.1 as follows:]

[F] 903.3 Installation requirements. Automatic sprinkler systems shall be designed and installed in accordance with Sections 903.3.1 through 903.3.~~7~~ 6.

[F] 903.3.1 Standards. Sprinkler systems shall be designed and installed in accordance with Section 903.3.1.1~~,~~ or 903.3.1.2 ~~or 903.3.1.3~~.

[Delete Section 903.3.1.2 and renumber Section 903.3.1.3 as follows:]

~~**[F] 903.3.1.2 NFPA 13R sprinkler systems.** Where allowed in buildings of Group R, up to and including four stories in height, automatic sprinkler systems shall be installed throughout in accordance with NFPA 13R.~~

~~**[F] 903.3.1.2.1 Balconies and decks.** Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units where the building is of Type V construction. Sidewall sprinklers that are used to protect such areas shall be permitted to be~~

SECTION 903
AUTOMATIC SPRINKLER SYSTEMS

C903.2 Where required. Requires that except in Groups F-2 and S-2, approved automatic sprinkler systems shall be provided throughout all new buildings. All buildings, other than Groups F-2 and S-2, containing combustible material shall be provided with an automatic sprinkler system in high performance buildings.

C903.3 Installation requirements. Removes the NFPA 13R option for residential type occupancies. NFPA 13R sprinkler systems were removed from the code based on their reduced property protection features.

C903.3.1 Standards. Removes unnecessary language within this code. NFPA 13R sprinkler systems were removed from the code based on their reduced property protection features.

C903.3.1.2 NFPA 13R sprinkler systems. Removes an exception that referenced NFPA 13R. NFPA 13R sprinkler systems were removed from the code based on their reduced property protection features.

~~located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies and decks that are constructed of open wood joist construction.~~

[F] 903.3.1.~~3~~ 2 NFPA 13D sprinkler systems. Where allowed, automatic sprinkler systems in one- and two-family dwellings shall be installed throughout in accordance with NFPA 13D.

[Revise Item 2 to Section 903.3.5.1.1 as follows:]

[F] 903.3.5.1.1 Limited area sprinkler systems. Limited area sprinkler systems.....(No change to text).....

2. The domestic service shall be capable of supplying the simultaneous domestic demand and the sprinkler demand required to be hydraulically calculated by NFPA 13~~, NFPA 13R~~ or NFPA 13D.

[Delete Section 903.3.5.1.2 as follows:]

~~**[F] 903.3.5.1.2 Residential combination services.** A single combination water supply shall be allowed provided that the domestic demand is added to the sprinkler demand as required by NFPA 13R.~~

[Delete Exception 4 to Section 903.4 as follows:]

[F] 903.4 Sprinkler system monitoring and alarms. All valves controlling the water supply.....(No change to text).....

(Renumber Exceptions 4 to 7)

~~3. Automatic sprinkler systems installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the automatic sprinkler systems and a separate shutoff valve for the automatic sprinkler system is not provided.~~

SECTION 905
STANDPIPE SYSTEMS

[Delete Exceptions 1 and 4 to Section 905.3.1 as follows:]

[F] 905.3.1 Building height. Class III standpipe systems .....(No change to text).....

Exceptions:

~~1. Class I standpipes are allowed in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.~~

C903.3.5.1.1 Limited area sprinkler systems. Requires that the domestic water main must be hydraulically sized to accommodate both demands in accordance with NFPA 13 or 13D.

C903.3.5.1.2 Residential combination services. Does not permit residential combination services. This section was deleted because it is contained in the NFPA 13R Standard.

C903.4 Sprinkler system monitoring and alarms. Requires that all sprinkler cutoff valves and other control valves be monitored. Exception #3 was removed based on its reference to NFPA 13R. NFPA 13R sprinkler systems were removed from the code based on their reduced property protection features.

SECTION 905
STANDPIPE SYSTEMS

C905.3.1 Building height. Requires that Class III standpipe systems shall be installed throughout buildings where the floor level of the highest story is located more than 30 feet (9,144 mm) above the lowest level of fire department vehicle access, or where the floor level of the lowest story is located more than 30 feet (9144 mm) below the highest level of fire department vehicle access. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

(Renumber Exceptions)

~~4. Class I standpipes are allowed in basements equipped throughout with an automatic sprinkler system.~~

[Delete Exception to Section 905.3.4 as follows:]

[F] 905.3.4 Stages. .....(No change to text).....

~~**Exception:** Where the building or area is equipped throughout with an automatic sprinkler system, a 1-1/2-inch (38 mm) hose connection shall be installed in accordance with NFPA 13 or in accordance with NFPA 14 for Class II or III standpipes.~~

C905.3.4 Stages. Stages greater than 1,000 square feet in area (93m^2) shall be equipped with a Class III wet standpipe system with 1-1/2-inch and 2-1/2-inch (38 mm and 64 mm) hose connections on each side of the stage. Exception was removed that allowed standpipe trade-off when the building is sprinklered. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Delete Exception to Section 905.4.1 as follows:]

[F] 905.4.1 Protection. .....(No change to text).....

~~**Exception:** In buildings equipped throughout with an approved automatic sprinkler system, laterals that are not located within an enclosed stairway or pressurized enclosure are not required to be enclosed within fire-resistance-rated construction.~~

C905.4.1 Protection. Exception was removed that allowed sprinkler laterals feeding standpipes not to be enclosed with fire-resistance construction. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

SECTION 907
FIRE ALARM AND DETECTION SYSTEMS

SECTION 907
FIRE ALARM AND DETECTION SYSTEMS

[Modify Section 907.2 as follows:]

[F] 907.2 Where required. An approved manual, automatic or manual and automatic fire alarm system installed in accordance with the provisions of this code and NFPA 72 shall be provided in new buildings and structures in accordance with Sections 907.2.1 through 907.2.23 and provide occupant notification in accordance with Section 907.9, unless other requirements are provided by another section of this code. Where automatic sprinkler protection installed in accordance with Section 903.3.1.1 ~~or 903.3.1.2~~ is provided and connected to the building fire alarm system, automatic heat detection required by this section shall not be required. The automatic fire detectors shall be smoke detectors. Where ambient conditions prohibit installation of automatic smoke detection, other automatic fire detection shall be allowed.

C907.2 Where required. Requires that sprinkler systems be designed in accordance with NFPA 13 or 13D. Deleted reference to NFPA 13R. NFPA 13R sprinkler systems were removed from the code based on their reduced property protection features.

[Delete Exception to Section 907.2.1 as follows:]

[F] 907.2.1 Group A. A manual fire alarm system .....(No change to text).....

~~**Exception:** Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system and the alarm notification appliances will activate upon sprinkler water flow.~~

C907.2.1 Group A. Requires that manual fire alarm boxes be installed when the building is provided with automatic sprinkler systems. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Delete Exception to Section 907.2.2 as follows:]

[F] 907.2.2 Group B. A manual fire alarm system .....(No change to text).....

~~**Exception:** Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system and the alarm notification appliances will activate upon sprinkler water flow.~~

C907.2.2 Group B. Requires that manual fire alarm boxes be installed when the building is provided with automatic sprinkler systems. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Modify Section 907.2.3 and Exception 3 as follows:]

[F] 907.2.3 Group E. A manual fire alarm system shall be installed in Group E occupancies. When ~~automatic sprinkler systems or~~ smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system.

Exceptions:

3. Manual fire alarm boxes shall not be required in Group E occupancies where ~~the building is equipped throughout with an approved automatic sprinkler system,~~ the notification appliances will activate on sprinkler water flow and manual activation is provided from a normally occupied location.

C907.2.3 Group E. Requires that manual fire alarm boxes be installed when the building is provided with automatic sprinkler systems. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Delete Exception to Section 907.2.4 as follows:]

[F] 907.2.4 Group F. A manual fire alarm system .....(No change to text).....

~~**Exception:** Manual fire alarm boxes are not required when the building is equipped throughout with an automatic sprinkler system and the notification appliances will activate upon sprinkler water flow.~~

C907.2.4 Group F. Requires that manual fire alarm boxes be installed when the building is provided with automatic sprinkler systems. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Delete Exception 1 to Section 907.2.6.1 as follows:]

[F] 907.2.6.1 Group I-1. Corridors, habitable spaces other than sleeping units and kitchens and waiting areas that are open to corridors shall be equipped with an automatic smoke detection system.

Exceptions:

~~1. Smoke detection in habitable spaces is not required where the facility is equipped throughout with an automatic sprinkler system.~~

~~2.~~ Smoke detection is not required for exterior balconies.

C907.2.6.1 Group I-1. Requires smoke detection in addition to required sprinkler protection. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Delete Exception 3 to Section 907.2.6.3.3 as follows:]

[F] 907.2.6.3.3 Smoke detectors. An approved automatic smoke detection system.....(No change to text).....

C907.2.6.3.3 Smoke detectors. Requires smoke detection in sleeping units with four or fewer occupants. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

Exceptions:

(No change to Exceptions 1 and 2)

~~3. Smoke detectors are not required in sleeping units with four or fewer occupants in smoke compartments that are equipped throughout with an approved automatic sprinkler system.~~

[Modify Exception 2 to Section 907.2.7 as follows:]

[F] 907.2.7 Group M. A manual fire alarm system .....(No change to text).....

C907.2.7 Group M. Removes unnecessary language within this code. Corrects language in the exception.

Exceptions:

1. Covered mall buildings complying with Section 402.
2. Manual fire alarm boxes are not required where ~~the building is equipped throughout with an automatic sprinkler system and~~ the alarm notification appliances will automatically activate upon sprinkler water flow.

[Modify Exception 2 to Section 907.2.8.1 as follows:]

[F] 907.2.8.1 Manual fire alarm system. A manual fire alarm system shall be installed in Group R-1 occupancies.

C907.2.8.1 Manual fire alarm system. Removes unnecessary language within this code. Removes unnecessary language in the exception.

Exceptions:

(No change to Exception 1)

2. Manual fire alarm boxes are not required throughout the building when the following conditions are met:

   ~~2.1. The building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2;~~

   ~~2.2~~ 2.1. The notification appliances will activate upon sprinkler water flow; and

   ~~2.3~~2.2. At least one manual fire alarm box is installed at an approved location.

[Modify Exceptions 2 and 3 to Section 907.2.9 as follows:]

[F] 907.2.9 Group R-2. A manual fire alarm system .....(No change to text).....

C907.2.9 Group R-2. Removes unnecessary language within this code. Removes and corrects exceptions.

Exceptions:

(No change to Exception 1)

2. Manual fire alarm boxes are not required throughout the building when the ~~following conditions are met~~:

~~2.1.The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or Section 903.3.1.2; and~~

~~2.2.The~~ notification appliances will activate upon sprinkler flow.

3. A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units ~~and are protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2,~~ provided that dwelling units either have a means of egress door opening directly to an exterior exit access that leads directly to the exits or are served by open-ended corridors designed in accordance with Section 1023.6, Exception 4.

[Add new Section 907.2.24 as follows:]

907.2.24 Wildland urban interface areas. An automatic smoke detection system shall be installed throughout buildings located within areas designated by the jurisdiction as being a wild land urban interface area.

C907.2.24. Wildland urban interface area. To provide added life safety for occupants in wildland urban interface areas the HPBRS requires high performance buildings located where the risk of wild land fire exist to have smoke detection systems in the building to provide early warning to occupants should a fire incident from outside begin to spread to the interior of the building.

[Modify Section 907.4.3.1 as follows:]

907.4.3.1 Automatic sprinkler system. For conditions other than specific fire safety functions noted in Section 907.3, in areas where ambient conditions prohibit the installation of smoke detectors, an ~~*automatic sprinkler system* installed in such areas in accordance with Section 903.3.1.1 or 903.3.1.2 and that is connected to the fire alarm system shall be~~ *approved* as automatic heat detection system shall be permitted.

C907.4.3.1. Automatic sprinkler system. The HPBRS requires most buildings to be provided with automatic sprinkler protection. The language being removed is unnecessary.

[Add Exception 4 to Section 907.6.5 as follows:]

[F] 907.6.5 Monitoring. Fire alarm systems required by this chapter or by the *International Fire Code* shall be monitored by an *approved* supervising station in accordance with NFPA 72.

Exception: Monitoring by a supervising station is not required for:

(No change to Exceptions 1 through 3)

4. Smoke detection systems required by Section 907.2.24 which are located in extreme hazard areas.

C907.6.5. Monitoring. The smoke detection system required in new section 907.2.24 for high performance buildings constructed in areas at risk from wildland fires is exempt from the requirement for full supervision monitoring.

CHAPTER 10
MEANS OF EGRESS

SECTION 1007
ACCESSIBLE MEANS OF EGRESS

[Revise Section 1007.2.1 as follows:]

1007.2.1 Elevators required. In buildings where a required accessible floor is ~~four~~ one or more stories above or below a level of exit discharge, at least one required accessible means of egress shall be an ~~elevator~~ Occupant Evacuation Elevator complying with Section 1007.4.

Exceptions:

1. ~~In buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2,~~ The elevator shall not be required on floors provided with a horizontal exit and located at or above the level of exit discharge.

2. ~~In buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2,~~ The elevator shall not be required on floors provided with a ramp conforming to the provisions of Section 1010.

[Modify Exception 1 and delete Exception 2 and 3 to Section 1007.3 as follows:]

1007.3 Stairways. In order to be considered part.....(No change to text).....or a horizontal exit.

Exceptions:

1. The area of refuge is not required at unenclosed interior exit stairways as permitted by Section 1020.1 ~~in buildings or facilities that are equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

~~2. The clear width of 48 inches (1219 mm) between handrails is not required at exit stairways in buildings or facilities equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

~~3. Areas of refuge are not required at exit stairways in buildings or facilities equipped throughout by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

(No change to Items 4 through 7 except renumbering)

SECTION 1007
ACCESSIBLE MEANS OF EGRESS

C1007.2.1 Elevators required. Requires at least one occupant evacuation elevator when an elevator is required. The feature will provide for the self-evacuation of those with accessibility needs.

C1007.3 Stairways. Requires that all stairways provide a minimum of 48 inches between stairway handrails and that all stairways provide an area of refuge. Removes sprinkler trade-offs for stairways. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

[Delete Exception 2 to Section 1007.4 as follows:]

1007.4 Elevators. In order to be considered part .....(No change to text).....or a horizontal exit.

Exceptions:

1. Elevators are not required to be accessed from an area of refuge or horizontal exit in open parking garages.

2. ~~Elevators are not required to be accessed from an area of refuge or horizontal exit in buildings and facilities equipped throughout by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

(No change to Items 3 and 4 except renumbering)

C1007.4 Elevators. The revisions to Exception No. 2 to 1007.4 for accessing elevators from areas of refuge is based on the premise that most high performance buildings with occupancies where this applies will also be provided with automatic sprinkler protection systems and an exception for this access due to sprinkler protection is not warranted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

SECTION 1014
EXIT ACCESS

[Revise Exception 1 and delete Exception 4 to Section 1014.3 as follows:]

1014.3 Common path of egress travel. In occupancies other than Groups H-1, H-2 and H-3,.....(No change to text).....see Section 1025.8.

Exceptions:

1. The length of a common path of egress travel in Group ~~B~~, F and S occupancies shall not be more than 100 feet (30 480 mm), provided that the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. Where a tenant space in Group B, S and U occupancies has an occupant load of not more than 30, the length of a common path of egress travel shall not be more than 100 feet (30 480 mm).

3. The length of a common path of egress travel in a Group I-3 occupancy shall not be more than 100 feet (30 480 mm).

4. ~~The length of a common path of egress travel in a Group R-2 occupancy shall not be more than 125 feet (38 100 mm), provided that the building is protected throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.~~

SECTION 1014
EXIT ACCESS

C1014.3 Common path of egress travel. The revisions to these two exceptions to 1014.3 for common paths of travel are based on the premise that Group B and R-2 occupancies in high performance buildings will also be provided with automatic sprinkler protection systems and exceptions for the common path of travel due to sprinkler protection in Group B and R-2 are not warranted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

SECTION 1015
EXITS AND EXIT ACCESS DOORWAYS

[Delete Exception to Section 1015.1 as follows:]

1015.1 Exits or exit access doorways from spaces. Two exits .....(No change to text).....in Table 1015.1.

> ~~**Exception:** In Groups R-2 and R-3 occupancies, one means of egress is permitted within and from individual dwelling units with a maximum occupant load of 20 where the dwelling unit is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.~~

[Delete Exception 2 to Section 1015.2.1 as follows:]

1015.2.1 Two exits or exit access doorways. Where two exits .....(No change to text).....access doorways.

Interlocking or scissor stairs shall be counted as one exit stairway.

Exceptions:

1. Where exit enclosures are provided as a portion of the required exit and are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1017, the required exit separation shall be measured along the shortest direct line of travel within the corridor.

2. ~~Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance of the exit doors or exit access doorways shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.~~

SECTION 1015
EXITS AND EXIT ACCESS DOORWAYS

C1015.1 Exits or exit access doorways from spaces. The revisions to delete this exceptions to 1015.1 for egress doorways from spaces is based on the premise that Group R-2 occupancies in high performance buildings will also be provided with automatic sprinkler protection systems and the exception due to sprinkler protection is not warranted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

C1015.2.1 Two exits or exit access doorways. The revisions to delete this exception to 1015.2.1 for the distance between exit access doorways is based on the premise that most occupancies in high performance buildings will also be provided with automatic sprinkler protection systems and this exception for allowing a shorter distance between exits and exit doorways due to sprinkler protection is not warranted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

SECTION 1016
EXIT ACCESS TRAVEL DISTANCE

[Revise Table 1016.1 as follows:]

SECTION 1016
EXIT ACCESS TRAVEL DISTANCE

TABLE 1016.1
EXIT ACCESS TRAVEL DISTANCE[a]

Occupancy	~~Without Sprinkler System~~ (feet)	~~With Sprinkler System (feet)~~
A, E, F-1, M, R, S-1	200	~~250[b]~~
I-1	~~Not Permitted~~ 200	~~250[e]~~
B	200	~~300[e]~~
F-2, S-2, U	300	~~400[e]~~
H-1	~~Not Permitted~~ 75	~~75[e]~~
H-2	~~Not Permitted~~ 100	~~100[e]~~
H-3	~~Not Permitted~~ 150	~~150[e]~~
H-4	~~Not Permitted~~ 175	~~175[e]~~
H-5	~~Not Permitted~~ 200	~~200[e]~~
I-2, I-3, I-4	150	~~200[e]~~

For SI: 1 foot = 304.8 mm.

a. See the following sections for modifications to exit access travel distance requirements:
Section 402.4: For the distance limitation in malls.
Section 404.9: For the distance limitation through an atrium space.
Section 407.4: For the distance limitation in Group I-2.
Sections 408.6.1 and 408.8.1: For the distance limitations in Group I-3.
Section 411.4: For the distance limitation in special amusement buildings.
Section 1014.2.2: For the distance limitation in Group I-2 hospital suites.
Section 1015.4: For the distance limitation in refrigeration machinery rooms.
Section 1015.5: For the distance limitation in refrigerated rooms and spaces.
Section 1021.2: For buildings with one exit.
Section 1028.7: For increased limitation in assembly seating.
Section 1028.7: For increased limitation for assembly open-air seating.
Section 3103.4: For temporary structures.
Section 3104.9: For pedestrian walkways.

~~b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2..~~

~~e. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

TABLE C1016.1 EXIT ACCESS TRAVEL DISTANCE. Table 1016.1 specifies the maximum travel distances to reach exits on any floor in a building. Since most high performance buildings are required to be sprinklered there is no justification to permit any increase in the travel distance. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

SECTION 1018
CORRIDORS

[Revise Table 1018.1 as follows:]

TABLE 1018.1
CORRIDOR FIRE-RESISTANCE RATING

Occupancy	Occupant Load Served By Corridor	Required Fire Resistance Rating (Hours)	
		~~Without Sprinkler System~~	~~With Sprinkler System~~[c]
H-1, H-2, H-3	All	~~Not Permitted~~	1
H-4, H-5	Greater than 30	~~Not Permitted~~	1
A, B, E, F, M, S, U	Greater Than 30	~~1~~	~~0~~ 1
R	Greater than 10	~~Not Permitted~~	~~0.5~~ 1
I-2[a], I-4	All	~~Not Permitted~~	0
I-1, I-3	All	~~Not Permitted~~	1[b]

a. For requirements for occupancies in Group I-2, see Section 407.3.
b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.7.
~~c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.~~

[Delete Exception 2 to Section 1018.4 as follows:]

1018.4 Dead ends. Where more than one exit or exit access doorway is required, the exit access shall be arranged such that there are no dead ends in corridors more than 20 feet (6096 mm) in length.

Exceptions:

1. In occupancies in Group I-3 of Occupancy Condition 2, 3 or 4 (see Section 308.4), the dead end in a corridor shall not exceed 50 feet (15 240 mm).

~~2. In occupancies in Groups B, E, F, I-1, M, R-1, R-2, R-4, S and U where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the length of dead-end corridors shall not exceed 50 feet (15 240 mm).~~

~~3~~ 2. A dead-end corridor shall not be limited in length where the length of the dead-end corridor is less than 2.5 times the least width of the dead-end corridor.

C1018.4 Dead ends. The revisions to delete this exception to 1018.4 for increasing the length of dead end corridors is based on the premise that most occupancies in high performance buildings will also be provided with automatic sprinkler protection systems and this increase in length due to sprinkler protection is not warranted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

SECTION 1020
EXIT ENCLOSURES

[Revise Exception 9 to Section 1020.1 as follows:]

1020.1 Enclosures required. Interior exit stairways .....(No change to text).....purpose other than means of egress.

Exceptions:

(No changes to Exception Items 1 through 8)

C1020.1 Enclosures required. The revisions to the Exception No. 9 to 1020.1 for stairway enclosures is based on the premise that most high performance buildings with occupancies where this applies will also be provided with automatic sprinkler protection systems and an exception for this enclosure requirement due to sprinkler protection is not warranted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

9. In other than Group H and I occupancies, interior egress stairways serving only the first and second stories of a building ~~equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1~~ are not required to be enclosed, provided at least two means of egress are provided from both floors served by the unenclosed stairways. Such interconnected stories shall not be open to other stories. Unenclosed exit stairways shall be remotely located as required in Section 1015.2.

SECTION 1021
NUMBER OF EXITS AND CONTINUITY

[Revise Exception 4 to Section 1021.1 as follows:]

1021.1 Exits from stories. All spaces.....(No change to text).....at grade or the public way.

Exceptions:

(No change to Exceptions 1 through 3)

4. In Groups R-2 and R-3 occupancies, one means of egress is permitted within and from individual dwelling units with a maximum occupant load of 20 ~~where the dwelling unit is equipped throughout with an automatic sprinkler system in accordance with Sections 903.3.1.1or 903.3.1.2.~~

[Revise Footnotes to Table 1021.2 as follows:]

For SI: 1 foot = 304.8 mm.

a. For the required number of exits for open parking structures, see Section 1019.1.1.

b. For the required number of exits for air traffic control towers, see Section 412.1.

c. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 ~~or 903.3.1.2~~ and provided with emergency escape and rescue openings in accordance with Section 1026

d. Group ~~B~~, F and S occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum travel distance of 100 feet.

e. Day care occupancies shall have a maximum occupant load is 10.

SECTION 1026
EXTERIOR EXIT RAMPS AND STAIRWAYS

[Revise Exception 4 to Section 1026.6 as follows:]

1026.6 Exterior ramps and stairway protection. Exterior exit .....(No change to text).....from normally occupied spaces.

SECTION 1021
NUMBER OF EXITS AND CONTINUITY

C1021.1 Exits from stories. The revisions to Exception No. 4 to 1021.1 for number of exits in a dwelling unit is based on the premise that high performance buildings with Group R occupancies where this applies will also be provided with automatic sprinkler protection systems and this exception for exits from dwelling units due to sprinkler protection is not warranted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

Footnotes to Table C1021.2. The revisions to Footnotes "c" and "d" of Table 1021.2 is based on the premise that high performance buildings with Group B and R occupancies where these apply will also be provided with automatic sprinkler protection systems throughout. Footnote "c" is revised to omit Group R buildings sprinklered in accordance with NFPA 13R since that standard, which permits sprinklers to be omitted in concealed combustible spaces, is not allowed to meet the sprinkler requirements in high performance Group R buildings. Footnote "d" is revised since all Group B occupancy high performance buildings must be sprinklered. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

SECTION 1026
EXTERIOR EXIT RAMPS AND STAIRWAYS

C1026.6 Exterior ramps and stairway protection. Removes NFPA 13R sprinkler reference. NFPA 13R sprinkler systems were removed from the code based on their reduced property protection features.

Exceptions:

(No changes to Exception Items 1 through 3)

4. Separation from the interior of the building is not required for exterior ramps or stairways connected to open-ended corridors, provided that Items 4.1 through 4.4 are met:

4.1. The building, including corridors and ramps and/or stairs, shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 ~~or 903.3.1.2.~~

(No change to Items 4.2 through 4.4)

SECTION 1027
EXIT DISCHARGE

[Delete Exception 1, Item 1.3 to Section 1027.1 as follows:]

1027.1 General. Exits shall discharge.....(No change to text).....building.

Exceptions:

1. A maximum of 50 percent of the number and capacity of the exit enclosures is permitted to egress through areas on the level of discharge provided all of the following are met:

(No change to Items 1.1 and 1.2)

~~1.3. The egress path from the exit enclosure on the level of discharge is protected throughout by an approved automatic sprinkler system. All portions of the level of discharge with access to the egress path shall either be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of exits.~~

(No changes to Exception Items 2 through 4)

SECTION 1027
EXIT DISCHARGE

C1027.1 General. The revisions to Exception No. 1 to 1027.1 for exit discharge is based on the premise that most high performance buildings with occupancies where this applies will also be provided with automatic sprinkler protection systems and an exception for this enclosure requirement due to sprinkler protection is not warranted. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

CHAPTER 11
ACCESSIBILITY

[No additional provisions are required.]

CHAPTER 12
INTERIOR ENVIRONMENT

INTERIOR ENVIRONMENT. This chapter of the building code is used to regulate the ventilation, temperature control, lighting, yards and courts, sound transmission, room dimensions, surrounding materials, and rodent proofing as they relate to the interior the building. Many of these provisions are minimum requirements. For a HPBRS, many of these provisions must be modified to provide a higher degree of sustainability of the interior environment for the building and its occupants. Thus, the modifications to this chapter include additional requirements as follows:

SECTION 1202
DEFINITIONS

[Add the following definitions to Section 1202.1:]

CLASSROOM: Rooms or spaces in buildings designed for instructional activities on a regular basis.

EXPRESSWAY: Highways that are provided with a median between opposing travel lanes and have a minimum of four lanes, controlled access for a minimum of 16 kilometers (10 miles), and a minimum posted speed of 45 mph (70 km/h).

SECTION 1203
VENTILATION

[Revise Section 1203.1 as follows:]

1203.1. General. Buildings shall be provided with natural ventilation in accordance with Section 1203.4, or mechanical ventilation in accordance with the *International Mechanical Code*. In addition, buildings shall comply with ASHRAE 62.1, *Ventilation for Acceptable Indoor Air Quality.*

[Add new Sections 1203.6, 1203.7 and 1203.8 as follows:]

1203.6 Particulate Matter Removal. Particulate matter filters or air cleaners shall be installed in accordance with Section 1203.6.1 and 1203.6.2.

Exception. In Group F buildings where the presence of particulate matter is not an issue.

1203.6.1 Minimum Efficiency Reporting Value (MERV). Particulate matter filters or air cleaners having a minimum efficiency reporting value (MERV) of not less than 8 when rated in accordance with ANSI/ASHRAE Standard 52.2 shall be provided upstream of all cooling coils or other devices with wetted surfaces through which air is supplied to an occupiable space. HVAC equipment shall be designed and maintained to provide adequate pressure and air flow.

SECTION 1203
VENTILATION

C1203.1. General. The code has general requirements for natural or mechanical ventilation in buildings that provide minimum requirements for the health of building occupants. However, these requirements are only minimum requirements and do not provide as high a level of air quality to be considered high performance. This change adds the requirements of ASHRAE Standard 62.1 to increase the level of building ventilation for improved indoor air quality.

C1203.6 Particulate Matter Removal - Airborne particulate matter can create an unhealthy environment within buildings, particularly for persons with respiratory problems. This addition requires a minimum efficiency reporting value (MERV) of 8 for air cleaners on cooling systems for most buildings. This value is determined in accordance with ASHRAE Standard 52.2, *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. In areas where the outside environment is classified as a "non-attainment area" for air quality according to the National Ambient Air Quality Standards the air cleaner shall have a MERV of 13.

1203.6.2 Non-attainment areas. For buildings located in areas determined by the building official to be designated as "non-attainment" per 40 CFR 50, particle filters or air-cleaning devices shall be provided to clean outdoor air prior to its introduction to occupied spaces and shall have a MERV of not less than 13 when rated in accordance with ASHRAE Standard 52.2.

1203.7 Carbon Dioxide (CO2) Detection. CO_2 monitors shall be installed in accordance with the following requirements

Location. CO_2 monitors shall be installed in each occupied and ventilated space and at least one monitor shall be installed on the exterior of the building.

Installation Height. Monitors shall be installed at a height of not less than 3 feet and not more than 6 feet above the floor for interior installations and above the sill plate of an entranceway for exterior installations.

CO_2 Monitor Requirements. Monitors shall be equipped with a direct read-out display in the occupied space and shall have an accuracy level of 50 parts per million (ppm).

1203.8 Recreational Smoking. Areas for recreational smoking shall comply with the requirements in this section1 above.

1203.8.1 Smoking Area Signage. Signage for recreational smoking areas shall be provided to indicate no smoking areas at entrances, air intakes, and operable windows in all areas open to public access and for all public spaces within buildings in accordance with the following.

1203.8.1.1 Entrances. Signs stating "No Smoking within 25 Feet" shall be installed at all entrances and signs stating "No Smoking Between Signs" or No Smoking Between this Sign and the Entrance" shall be installed in the plane of the building exterior wall no less than 25 feet beyond both sides of every entrance.

Exception. When entrances occur at or within 25 feet of an exterior corner, signage that would extend beyond the building exterior is not required.

1203.8.1.2 Intakes. Signs stating "No Smoking within 25 Feet" shall be installed at all air intakes located in areas at the perimeter of the building and having public access.

C1203.7 Carbon Dioxide (CO_2) Detection – CO_2 monitors will now be required in all occupied and ventilated spaces and at least one monitor will be required outside the building.

C1203.8 Recreational Smoking – As no smoking policies becomes more common within buildings in some jurisdictions there is increased demand for establishing designated areas within and around buildings where occupants who choose to continue recreational smoking can congregate. These provisions are intended to guide building owners and operators on establishing no smoking areas near entrances to and within buildings except at designated areas. Where designated rooms or spaces with a building are established for smoking, the provisions specify the minimum requirements for the construction of the recreational smoking areas. The indoor recreational areas are required to be provided with an enclosure with reduced air leakage for openings, exhaust systems that create a negative pressure minimize airflow out of the space, and self-contained ventilation systems independent of systems serving other parts of the building.

1203.8.1.3 Operable Windows. Signs stating "No Smoking within 25 Feet" shall be installed on both sides of operable windows or multiple operable windows, on ground level and having public access. When multiple operable windows extend more than 50 feet additional signs shall be installed so that spacing between signs does not exceed 50 feet.

1203.8.1.4 Interior Public Spaces. Signs stating "No Smoking" shall be provided at all public entrances to each floor of the building or signs stating "No Smoking in Building" shall be installed at all entrance ways.

1203.8.2 Smoking Area Ventilation. Designated smoking areas within the building shall comply with the following requirements.

1203.8.2.1 Sealing of Designated Areas. Smoking areas shall be equipped with doors and the entire space sealed to provide no more than 1.25 square inch of leakage per 100 square feet of enclosure area as determined by ASTM E779.

Exception. For Group R occupancies the provisions of section 1203.5.2.1 and 1204.6.2.2 shall be permitted to be waived when doors to common areas are weatherstripped and each residential unit is sealed to provide no more than 1.25 square inch of leakage per 100 square feet of enclosure area as determined by ASTM E779.

1203.8.2.2 Pressure Differential. The designated smoking area, with doors closed, shall operate exhaust sufficiently to create negative pressure with respect to adjacent spaces of at least 0.012 inches of water (5 Pa).

1203.8.2.3 Ventilation. Ventilation shall be exhausted to the exterior with no recirculation of air from the designated smoking area to the non-smoking areas of the building.

SECTION 1204
TEMPERATURE CONTROL

[Add new Section 1204.2 as follows:]

1204.2 Thermal Controls. Thermal controls shall be programmable in accordance with Sections 1204.2.1 through 1204.2.3.

1204.2.1 Program time periods shall be at least two periods per day and seven days per week.

1204.2.2 Programmable temperature controls shall have a range of at least 20 ºF (11 ºC) below interior design temperature during mechanical heating cycles

1204.2.3 Programmable temperature controls shall have a range of at least 10 ºF (5.5 ºC) above interior design temperature during mechanical cooling cycles.

SECTION 1205
LIGHTING

[Add new section 1205.3.1:]

1205.3.1 Light Pollution Reduction. The angle of maximum candela from each interior luminaire as located in the building shall intersect with opaque interior surfaces.

SECTION 1204
TEMPERATURE CONTROL

C1204.2 Thermal Controls – The present code only specifies the minimum temperature that must be maintained in interior spaces of buildings where human comfort is required. While HVAC equipment can provide this minimum temperature for comfort, the code does not mandate that the controls for these systems be programmable. This new section does introduce thermal controls for the interior of the building such that the temperature is permitted to go at least 20 ^{0}F lower during heating seasons and 10 ^{0}F higher during cooling seasons. The thermal controls shall be capable of programming in these changes for at least two time sets per day and for seven days of the week. This allows persons to reduce their energy demand for heating and cooling based on their own living habits and times of occupancy in the building

SECTION 1205
LIGHTING

C1205.3.1 Light Pollution Reduction – The code does have provisions for providing minimum light levels in occupied spaces through natural means such as windows and with artificial light systems. However, the location and direction of interior light fixtures can result in portions of the light being emitted overflowing through windows to the outside and creating light pollution. This not only creates a nuisance but also wastes energy by inadvertently providing light to the outside. To reduce the light being directed outside this section requires the main stream of light (i.e. candela) to be directed toward interior opaque surfaces such as walls and floors. This reduces the likelihood that internal lighting will produce unnecessary light pollution and waste electricity.

SECTION 1207
SOUND TRANSMISSION

[Revise Section 1207 as follows:]

1207.1 Scope. This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent rooms or units and between rooms or units ~~dwelling units or between dwelling units~~ and adjacent public areas such as hall, corridors, stairs or service areas, and the exterior envelope separating interior spaces from the outside environment for use and occupancy classifications A, B, E, I, M and R.

> **Exception.** For Group R occupancies the requirements apply only between adjacent dwelling units and between dwelling units and adjacent public areas.

1207.2 Air-Borne Sound. ~~Walls, partitions, and flooring/ceiling assemblies separating dwelling units from each other and from public or service areas shall have a~~ The sound transmission class (STC) shall be determined ~~of not less than 50 (45 if field tested) for air-borne noise when tested~~ in accordance with ASTM E90 for all assemblies or TMS 0302 for masonry assemblies. Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits; or heating, ventilating, or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings. This requirement shall not apply to room or dwelling unit entrance doors; however, such doors shall be tight fitting to the frame and sill.

> ~~**1207.2.1 Masonry** The sound transmission class of concrete masonry and clay masonry shall be calculated in accordance with TMS 0302 or determined through testing in accordance with ASTM E90.~~

> **1207.2.1 Interior Air-borne Sound.** The provisions of this section shall apply to walls, partitions, and flooring/ceiling assemblies.
>
> > **1207.2.1.1 Classrooms.** The wall and floor-ceiling assemblies separating a *classroom* from adjacent space shall comply with Section 1207.3.1.1, 1207.3.1.2 and 1207.3.1.3.
> >
> > > **1207.2.1.1.1 Restrooms and showers.** The assembly shall have a composite STC rating of not less than 53 (48 if field tested).

SECTION 1207
SOUND TRANSMISSION

SOUND TRANSMISSION – Presently the code only specifies that building assemblies (e.g. walls and floor/ceilings) between dwelling units or between dwelling units and public spaces be constructed to reduce sound transmission. The provisions in Section 1207 have been modified to expand airborne sound transmission requirements so they not only address airborne sources within the building but also to minimize airborne sound that is outside the building from infiltrating into the interior of the building. The requirements are to improve occupant comfort and productivity.

C1207.1 Scope. The HPBRS revises Section 1207.1 Scope to expand the list of occupancies that the sound transmission provisions apply to assembly, business, educational, institutional (assisted living, nursing homes, hospitals, prisons, etc) and mercantile occupancies.

C1207.2. Air-Borne Sound. These changes are part of the reformatting of the section on sound transmission to provide specific requirements for interior air-borne sound, exterior air-borne sound and structure-borne sound. Included in the reformat is moving the repetitive language on testing masonry assemblies in accordance with ASTM E90 and TMS 0302 and placing it into the main section requirements for clarity.

C1207.2 Interior Airborne Sound. Modifies the existing provisions that apply to interior airborne sound between dwelling units or between dwelling units and public spaces. In addition, the interior sound transmission limits have been expanded to include assemblies separating classrooms from each other and other noise producing spaces such as rest rooms, showers, music rooms, cafeterias and gymnasiums.

1207.2.1.1.2 Music rooms, mechanical rooms, cafeterias, gymnasiums, indoor swimming pools. The assembly shall have a composite STC rating of not less than 60 (55 if field tested).

1207.2.1.1.3 All other adjacent spaces. The assembly shall have a composite STC rating of not less than 50 (45 if field tested).

1207.2.1.2 Group R-1, I-1 and I-2. The wall and floor-ceiling assemblies separating individual units and between individual units and all other adjacent spaces shall have a composite STC rating of not less than 50 (45 if field tested).

1207.2.1.3 Group R-2. The wall and floor-ceiling assemblies separating dwelling units and between dwelling units and all other adjacent spaces shall have a composite STC rating of not less than 50 (45 if field tested).

1207.2.2 Exterior Air-Borne Sound. The exterior envelope separating occupied spaces in Group A, B, E, I, M and R occupancies from the outside environment shall comply with the following.

1. The exterior opaque wall and roof-ceiling assemblies shall have a composite sound STC rating of not less than 50 (45 if field tested).
2. The fenestration that is part of the opaque exterior wall or floor-ceiling assemblies shall have an STC of not less than 30 (25 if field tested).

C1207.2.2 Exterior Airborne Sound. Establishes provisions for exterior airborne sound that may impact the quality of the environment in assembly, business, educational, institutional (e.g., assisted living, nursing homes, hospitals, prisons, etc), mercantile, and residential occupancies. The STC rating for the opaque exterior envelope of these buildings is set at a minimum of 50 (45 if field tested). The STC rating for the fenestration that is part of the exterior envelope is set at a minimum of 30 (25 if field tested).

[Modify Section 1207.3 as follows]

1207.3 Structure-Borne Sound. Floor/ceiling assemblies between ~~dwelling~~ rooms or units and between ~~dwelling~~ rooms or units and public or service area within the structure in uses and occupancies classified as A, B, E, I, M, or R shall have an impact insulation classification (IIC) rating of not less than 50 (45 if field tested) when tested in accordance with ASTM E492.

C1207.3 Structure-Borne Sound. Renumbered and modified to establish that sound transmission for floor/ceiling assemblies applies to assembly, business, educational, institutional (e.g., assisted living, nursing homes, hospitals, prisons, etc), mercantile in addition to assemblies between dwelling units or between dwelling units and public spaces.

[Modify Sections 1210.1 and 1210.2 as follows]

1210.1 Floors and Wall Base Finish Materials ~~In other than dwelling units, t~~Toilet, bathing ~~and~~ shower room, kitchen, laundry room, and spa area floors and in hallways and classroom in Group E occupancies shall have a smooth, hard, nonabsorbent surface that extends upward onto the walls at least 6 inches (152 mm).

C1210.1 Floors and Wall Base Finish Materials. These modifications expand the requirements for durable surface materials for floors and wall bases to include residential dwelling units and the hallways and classrooms of Group E, Educational Occupancies

1210.2 Walls and Partitions. Walls and partitions within 2 feet (610 mm) of urinals and water closets shall have a smooth, hard, nonabsorbent surface to a height of 4 ft…[remainder unchanged] In hallways of Group E occupancies the walls shall have a hard, nonabsorbent surface to a height of 4 feet (1219 mm) above the floor, and except for structural elements, the materials used on such surfaces shall be of a type that is not adversely affected by moisture.

C1210.2 Walls and Partitions. These modifications expand the requirements for durable surface materials for walls to include the lower portion of the wall for hallways of Group E, Educational Occupancies.

[Add new Section 1211 as follows:]

SECTION 1211
BUILDING ENTRANCES

1211.1 General. All building entrances shall employ an entry mat system in accordance with the requirements of the ASHRAE 189.1 Section 8.3.1.5.

SECTION 1212
THERMAL COMFORT

[Add new Section 1212 as follows:]

1212 Thermal Comfort. The building shall be designed in accordance with Section 6.1 of ASHRAE Standard 55.

SECTION 1211
BUILDING ENTRANCES

C1211 Building Entrances – There are no provisions in the existing building code to regulate introduction of soils and other solid particulates that may be tracked into a building. Having to use housekeeping resources to address these materials is unproductive. To reduce the demand for these resources, provisions have been added to require building entrances to have entry mat systems to reduce these pollutants being carried into the building by foot traffic.

SECTION 1212
THERMAL COMFORT

C1212 Thermal Comfort – ASHRAE Standard 55 Thermal Environmental Conditions for Human Occupancy contains provisions to provide adequate levels of comfort to building occupants. For a HPB only Section 6.1 of ASHRAE Standard 55 is required.

CHAPTER 13
ENERGY EFFICIENCY

[Modify 1301 and add new Sections 1302, 1303 and 1304 as follows:]

SECTION 1301
GENERAL

1301.1 Scope. This section governs the design and construction of buildings for energy efficiency.

1301.1.1 Criteria. Buildings shall be designed and constructed in accordance with the *International Energy Conservation Code* and the mandatory requirements in Section 1303.1 through 1303.8.

SECTION 1302
DEFINITIONS

1302.1 General. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

BUILDING THERMAL ENVELOPE. The basement walls, exterior walls, floor, roof, and any other building element that enclose conditioned space. This boundary also includes the boundary between conditioned space and any exempt or unconditioned space.

FENESTRATION. Skylights, roof windows, vertical windows (fixed or moveable), opaque doors, glazed doors, glazed block, and combination opaque/glazed doors. Fenestration includes products with glass and non-glass glazing materials.

VISIBLE TRANSMITTANCE (VT): The ratio of visible light transmitted through a substance to the total visible light incident on its surface (also known as VLT, visible light transmittance).

ENERGY EFFICIENCY. This chapter of the building code is used to regulate energy use in buildings and reduce energy consumption through energy conservation measures specified in the *International Energy Conservation Code* (IECC). The IECC, like most building code requirements however, specifies minimum requirements for buildings. For high performance buildings, the requirements for energy efficiency must be given extra attention beyond minimum levels. Thus the modification to Chapter 13 of the IBC introduces additional requirements to raise the level of energy conservation for the high performance building. These requirements are introduced in a new Section 1303, mostly using ASHRAE Standard 189.1, *Standard for the Design of High Performance Green Buildings Except Low-Rise Residential Buildings*, as summarized below. Note that new definitions are required to apply the new provisions. In addition, there is a new Section 1304, Building Performance Criteria, to establish the minimum requirements to be used to determine compliance if a whole building approach is followed. Building designs using this approach are encouraged to use more explicit climate data since it will typically result in better high performance buildings.

SECTION 1301
GENERAL

C1301.1.1 Criteria. The IBC references the International Energy Conservation Code (IECC) for basic energy conservation provisions. For high performance buildings additional energy saving requirements are needed. This modification expands the requirements to include the additional mandatory criteria required for these HPBRS covered in Sections 1303.1 through 1303.8.

SECTION 1302
DEFINITIONS

C1302.1 General. The added energy conservation provisions for high performance buildings requires additional definitions be included for building thermal envelope, fenestration and visible light transmittance to assist the user in applying the HPBRS.

SECTION 1303
MANDATORY CRITERIA

1303.1 Daylighting by skylights. There shall be a minimum fenestration area providing daylighting by skylights or other toplighting for large enclosed spaces in accordance with the requirements of the ASHRAE 189.1 Section 8.3.4 or Section 8.5.1.

1303.2 Lighting. Lighting systems shall be provided with controls in accordance with the requirements of the ASHRAE 189.1 Section 7.4.6.

1303.3 Automatic control of HVAC and lights in Group R-1 guest rooms. Group R-1 buildings with more than 50 guest rooms shall be provided with HVAC and light control features in accordance with the requirements of the ASHRAE 189.1 Section 7.4.3.12.

1303.4 Fenestration. Fenestration for buildings shall comply with the following requirements.

1303.4.1 Fenestration Area Limitations. The vertical fenestration area (not including opaque doors) shall not exceed the values in Table 1303.4 for the gross area of the building thermal envelope.

Exception: Climate zones 7 and 8 are not required to have an SHGC requirement.

1303.4.2 Fenestration Orientation. For new developments on sites where the building footprint for all buildings is 25% or less than the total lot area, the vertical fenestration area and SHGC shall meet the following requirements to reduce solar gains from the east and west:

$$(A_N * SHGC_N + A_S * SHGC_S) \geq (A_E * SHGC_E + A_W * SHGC_W)$$

Where:
$SHGC_x$ = the *SHGC* for orientation x
A_x = vertical fenestration area for orientation x
N = north (oriented less than 45 degrees of true north)

SECTION 1303
MANDATORY CRITERIA

C1303.1 Daylighting by skylights. Introduces additional requirements to use outside light through skylights to provide lighting in the interior occupied spaces of the building. This supports less dependence on artificial light for these interior occupied spaces. With the increased use of skylight there are requirements also specified to provide lighting controls that automatically reduce the artificial lighting levels based on the available natural light coming from the skylights.

C1303.2 Lighting. To further reduce the electrical demand for artificial lighting, requirements are added that use occupant sensors to control the operation of lights within the building. These sensors have the ability to switch lighting circuits off when the space is unoccupied. Additional automatic controls are required to regulate artificial light in spaces with exterior vertical fenestration (e.g. windows) so the light levels are reduced when natural light is available to illuminate the occupied spaces. Finally, automatic controls capable of programming are required for exterior lighting. These controls allow the outside lighting to be turned off at set times to reduce operating during periods of daylight and to reduce lighting levels during non-peak hours of operation. There are exceptions to insure safe levels of lighting are maintained where necessary.

C1303.3 Automatic control of HVAC and lights in hotel/motel guest rooms. Like the section on lighting controls above, this section is to address not only lighting but also the heating and cooling systems for hotel and motel guest rooms. These controls not only turn off the lights when occupants are not in the rooms but also reduce the change the temperature settings so the heating and cooling does not maintain temperature levels at unnecessary levels while the room is vacant. These provisions are only intended for hotel and motel properties that have at least 50 guest rooms for occupancy.

C1303.4 Fenestration. One area where potential savings in energy demand exists for heating and cooling of buildings is in the amount of vertical fenestration (e.g. windows) used in the exterior envelope. To further reduce the energy demand, this section places limitations on the amount of area of the exterior wall that can be devoted to fenestration. These limits, outlined in Table 1303.4, are based on the type of occupancy, the climate zone where the building is located, and the solar heat gain coefficient of the glazed assembly. In addition to establishing limits on the amount of fenestration, provisions have also been added to further minimize energy demand by reducing the solar heat gain for fenestration that is oriented toward the east and west.

S = south (oriented less than 45 degrees of true south)
E = east (oriented less than or equal to 45 degrees of true east)
W = west (oriented less than or equal to 45 degrees of true west)

SHGC is allowed to be modified for permanent projects according to ASHRAE/IESNA Standard 90.1 Section 5.5.4.4.1

Exceptions:

1. Buildings where the total fenestration area is less than 5% of the gross wall area.
2. Buildings within 20ft (6m) of an existing building on one or more sides.
3. Buildings in climate zones 7 and 8.

1303.4.3. Visible light transmittance. The visible light transmittance (VLT) shall meet one of the following:

1. shall be no less than 0.50 or
2. the VLT/SHGC shall be at least 1.20.

1303.5 Peak load reduction factor. Building projects shall contain automatic systems such as demand-limiting or load shifting in accordance with the requirements of the ASHRAE 189.1 Section 7.4.5.1.

C1303.5 Peak load reduction/load factor. To further energy conservation on a larger scale, provisions are added that require automatic systems in the building to shift energy loads of the building to off-peak hours or to initiate load reduction during peak energy demand times for the systems supply energy to the building.

1303.6 Energy Star equipment. Equipment within the scope of the applicable Energy Star Program shall meet the requirements of ASHRAE Standard 189.1 Section 7.4.7.3.

C1303.6 Energy Star equipment. The U.S. EPA Energy Star program has shown itself to be a useful means for improving energy efficiency in buildings by utilizing more energy efficient equipment. This section being added makes it mandatory that equipment with the Energy Star label be used for many of the prevalent uses found in a building. This includes appliances, heating and cooling equipment, lighting fixtures, and food service equipment.

1303.7 Commercial refrigerators, freezers and clothes washers. Commercial refrigerators, freezers and clothes washers shall meet the requirements of ASHRAE Standard 189.1 Section 7.4.7.4.

C1303.7 Commercial refrigerators and freezers. There has been increased interest in improving the energy efficiency of occupancies where refrigerated display cases are used. One means to reduce energy demand is to prohibit open type cases. This section places that prohibition on this equipment. In addition, special requirements for lighting and ballasts used in refrigerator/freezer equipment are included to further improve energy efficiency.

1303.8 Energy monitoring. Buildings shall be provided with energy monitoring systems in accordance with the requirements of the ASHRAE 189.1 Section 7.3.3.

C1303.8 Energy monitoring. If building owners and operators would monitor the energy used in their buildings they would be able to incorporate energy saving features into the decision stream for building improvements. This section will require that the building be provided with an energy monitoring system capable of collecting data on energy consumption from all sources supplying the building systems, storing the data, and then have the capability to transmit the data to a designated data system for processing. This capability will give the building owners, operators, and utility providers the tools needed to maintain buildings below preset thresholds shown in ASHRAE Standard 189.1.

TABLE 1303.4.
FENESTRATION AS A PERCENTAGE OF GROSS AREA OF THE BUILDING THERMAL ENVELOPE

Occupancy Group	Climate Zone	Maximum Fenestration Area as Percent of Gross Wall Area	Maximum Solar Heat Gain Coefficient (SHGC)
Assembly			
A-1	1-3	3%	0.33
	4-8	3%	0.60
A-2	1-3	18%	0.33
	4-8	18%	0.60
A-3	1-3	3%	0.33
	4-8	3%	0.60
A-4	1-3	3%	0.33
	4-8	3%	0.60
Business			
B	1-3	40%	0.33
	4-8	40%	0.60
Educational			
E	1-3	18%	0.33
	4-8	18%	0.60
Factory			
F-1	1-3	3%	0.33
	4-8	3%	0.60
F-2	1-3	3%	0.33
	4-8	3%	0.60
High Hazard			
H-1	1-3	3%	0.33
	4-8	3%	0.60
H-2	1-3	3%	0.33
	4-8	3%	0.60
H-3	1-3	3%	0.33
	4-8	3%	0.60
H-4	1-3	3%	0.33
	4-8	3%	0.60
Institutional			
I-1	1-3	25%	0.33
	4-8	25%	0.60
I-2	1-3	25%	0.33
	4-8	25%	0.60
I-3	1-3	25%	0.33
	4-8	25%	0.60
I-4	1-3	35%	0.33
	4-8	35%	0.60
Mercantile			
M	1-3	15%	0.33
	4-8	15%	0.60
Residential			
R-1	1-3	35%	0.33
	4-8	35%	0.60
R-2	1-3	35%	0.33
	4-8	35%	0.60
R-3	1-3	35%	0.33
	4-8	35%	0.60
R-4	1-3	35%	0.33
	4-8	35%	0.60
Storage			
S-1	1-3	3%	0.33
	4-8	3%	0.60
S-2	1-3	3%	0.33
	4-8	3%	0.60
Utility			
U	1-3	N/A	N/A
	4-8	N/A	N/A

SECTION 1304
BUILDING PERFORMANCE CRITERIA

1304.1 Commercial Buildings. Commercial buildings shall meet the requirements of 1304.1.1, 1304.1.2, or 1304.1.3 in addition to the requirements of 1304.1.4:

1304.1.1 IECC. The building shall meet the mandatory requirements in Chapter 5 of the IECC. The proposed design as determined in accordance with Section 506.3 of the IECC shall have a minimum energy cost savings of at 20% compared to that of the standard design as determined in accordance with Section 506.4 of the IECC. The cost savings shall be demonstrated using Section 506 of the IECC.

1304.1.2 ASHRAE/IESNA Standard 90.1. The building shall meet the mandatory requirements of ASHRAE/IESNA Standard 90.1. The proposed building as determined in accordance with Appendix G of ASHRAE/IESNA Standard 90.1 shall have a minimum energy cost savings of 20% compared to that of the baseline building. The cost savings shall be demonstrated using Appendix G of ASHRAE/IESNA Standard 90.1.

1304.1.3 Energy Star. The building shall meet the mandatory requirements in ASHRAE/IESNA Standard 90.1. The baseline design shall have a minimum annual site energy use intensity (EUI) savings of 50% compared to the Energy Star Target Finder score of 50. The annual energy performance of the proposed building shall not exceed that of the baseline building. The EUI of the baseline building and proposed building is calculated using a computer-based simulation program that conforms to the requirements outlined in ANSI/ASHRAE/IESNA Standard 90.1, Appendix G, Section G2.2.

1304.1.4 Baseline for buildings. The baseline (or standard) for a building shall be the smaller of the actual building design or a design using the maximum criteria provided in Table 1304.1.4. Where a building contains multiple uses the criteria in Table 1304.1.4 shall be applied to each portion separately. There are no special for baseline building criteria for use and occupancy classifications not listed.

SECTION 1304
BUILDING PERFORMANCE CRITERIA

C1304.1 Commercial Buildings. Chapter 13 is further modified by adding new provisions in Section 1304 to specify specific building performance criteria that the high performance building must meet. These criteria are set to levels above the minimum presently required by the IECC. For example, the high performance building design must show that there is an energy cost savings that is 20 percent greater than a building built to the standard design requirements of Section 506.4 using the Total Building Performance requirements in Section 506 of the IECC. Similar requirements are specified for buildings built to ASHRAE Standard 90.1 using the Performance Rating Method in Appendix G. Finally, baseline building criteria are further set in Table 1304.1.4 for specific occupancies.

C1304.1.4. Baseline for buildings. Design and construction of actual building components are not restricted to these heights and areas. The heights and areas are provided solely to determine the energy performance of the baseline building. Buildings with taller floor-to-floor heights or larger building areas in Table 1304.1.4 simply need to be designed to be more energy efficient.

TABLE 1304.1.4
MAXIMUM BASELINE BUILDING CRITERIA[1]

Use and Occupancy Classification	Maximum Floor to Floor Height, in feet[2]	Maximum Building Area, in square feet[3]
Business Group B	10.5	300 per occupant
Instiutional Group I	12.0	No Requirement
Residential Group R-1[4]		
One Bedroom	10.5	1350
Two-Bedroom	10.5	2050
Three-Bedroom	10.5	2550
Four-Bedroom	10.5	3050
Additional Bedrooms	10.5	Additional 525 for each bedroom added to 3050
Residential Group R-2[5]		
One Bedroom	10.5	1125
Two-Bedroom	10.5	1625
Three Bedroom	10.5	2125
Four Bedroom	10.5	2625
Additional Bedrooms	10.5	Additional 438 for each bedroom added to 2625

[1] Where the perimeter of the baseline building is less than the actual building, glazing areas shall be proportionate to those of the actual building for each face of the building. Other dimensions of the baseline building that are less than the actual building shall also be proportionate to those of the actual building.

[2] Where the building is single story, the dimension is measured from the floor to top of ceiling/roof joist.

[3] The maximum area is for the total portion of the building in this use and occupancy classification.

[4] Total building area requirements are based on living units sized at 900 sq ft one-bedroom, 1300 sq ft two-bedroom, 1700 sq ft three-bedroom, 2100 sq ft four-bedroom and an additional 350 sq ft for each bedroom over 4. For R-1 structures an adjustement factor of 0.50 is applied.

[5] Total building area requirements are based on living units sized at 900 sq ft one-bedroom, 1300 sq ft two-bedroom, 1700 sq ft three-bedroom, 2100 sq ft four-bedroom and an additional 350 sq ft for each bedroom over 4. For R-2 structures an adjustment factor of 0.25 is applied to obtain the maximum total building area

CHAPTER 14
EXTERIOR WALLS

[Add the following definitions to 1402.1:]

EXTERIOR WALLS Chapter 14 of the building code is used to specify the minimum requirements that the exterior walls of a building must meet. These requirements include safety from fire exposure as well as weather elements. The material added to Chapter 14 for high performance buildings include requirements to address air infiltration, solar heat gain through the opaque walls, and improved fire resistance requirements.

SECTION 1402
DEFINITIONS

1402.1 General. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

HEAT CAPACITY: the amount of heat necessary to raise the temperature of a given mass 1°F. Numerically, the heat capacity per unit area of surface (Btu/ft2·°F) is the sum of the products of the mass per unit area of each individual material in the roof, wall, or floor surface multiplied by its individual specific heat.

SOLAR REFLECTANCE INDEX (SRI): a measure of a material surface's ability to reject solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is 0 and a standard white (reflectance 0.80, emittance 0.90) is 100.

SECTION 1402
DEFINITIONS

C1402.1 General. Definitions of the terms "heat capacity" and "solar heat index" have been added to help the user in applying thermal mass provisions and reducing solar gains through the exterior walls of a building.

SECTION 1403
PERFORMANCE REQUIREMENTS

[Add new Section 1403.7]

1403.7 Air Barrier. Exterior walls shall be designed and constructed in accordance with the applicable provisions of this section to resist the flow of air.

Exceptions:

1. Mass walls constructed in climate zones 1, 2, or 3 as defined in the International Energy Conservation Code.
2. Testing is not required for monolithic cast-in-place concrete or precast having a thickness of not less than 1.5 inches (38 mm) or for fully grouted concrete masonry unit construction.
3. When all joints are sealed, the following materials meet this requirement: plywood, exterior or interior gypsum wallboard, plaster, concrete, steel, and painted or sealed concrete masonry.

1403.7.1 Methods of Compliance. Any of the methods provided in Sections 1403.7.1.1 through 1403.7.1.3 shall be used to determine compliance with this section.

SECTION 1403
PERFORMANCE REQUIREMENTS

1403.7 Air Barrier. Air barrier provisions are added to the requirements for the exterior walls of a building to reduce air infiltration into the interior of the building. The use of air barrier systems does require additional attention to the interface of different materials forming the exterior wall assemblies and the acceptable air leakage rate for individual wall components and wall assemblies. Note that mass walls are exempt from the air barrier requirements in hotter climates where benefits of adding air barriers are not as cost effective.

1403.7.1.1 Completed Building Option. The building envelope shall be tested in accordance with ASTM E779 and the air leakage rate shall not exceed 0.40 cfm/ft^2 at a pressure differential of 0.3 in water gauge (1.57 psf) (2.0 L/s.m^2 at 75 Pa)

1403.7.1.2 Opaque Wall System Option. The opaque wall system shall be tested in accordance with ASTM 1677, ASTM E1680, ASTM E2178 or other approved methods and the measured air leakage shall not exceed 0.06 cfm/ft^2 under a pressure differential of 0.3 in water gauge (1.57) psf) (0.30 L/s.m^2 at 75 Pa).

1403.7.1.3 Wall Component Option. Components of an exterior opaque wall systems shall be tested in accordance with ASTM E2178 and the measured rate or air leakage shall not exceed 0.004 cfm/ft^2 at a pressure differential of 0.3 in water gauge (1.57 psf) (0.02 L/s.m^2 at 75 Pa).

1403.7.1.3.1 Sheet Membranes. All sections of sheet membranes shall lap adjacent sheets by at least 6 inches and all joint shall be taped.

1403.7.1.3.2 Membranes. All membranes, sheet or liquid applied, shall return at least 1.5 inches into all heads, jambs, and sills of openings having a minimum dimension larger than 8 inches.

1403.7.1.3.3 Membranes loads. All membranes, sheet or liquid applied, shall resist damage or displacement and shall transfer loads to the structure when subjected to the following loads:

1. Positive and negative pressure of wind, defined in ASCE 7 Minimum Design Loads for Buildings and Other Structures Section 6.2.
2. Fan pressures from HVAC & other mechanical systems
3. Stack pressures due to building height

1403.7.2 Penetrations. All penetrations for wiring, electrical devices, plumbing, ventilation, shall be sealed.

[Add new Section 1403.8 as follows:]

1403.8 Landscaping Sprinklers. Landscaping sprinklers shall not be designed or permitted to spray water on a building and within 3 ft (1 m) of a building.

1403.8 Landscaping Sprinklers. This provision has been added to minimize the wetting of exterior wall surfaces by landscaping sprinklers. The present code has no such provision. Frequently letting landscape sprinklers to continuously wet an exterior wall surface increases the risk of moisture infiltration resulting in mold growth and deterioration of the exterior wall assembly.

SECTION 1405
INSTALLATION OF WALL COVERINGS

[Revise Section 1405.14 as follows:]

1405.14 Vinyl siding. Vinyl siding conforming to the requirements of this section and complying with ASTM D 3679 shall be permitted on exterior walls of buildings ~~located in areas where the basic wind speed specified in Chapter 16 does not exceed 100 miles per hour (45 m/s) and the *building height* is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where the basic wind speed exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted~~ complying with all of the following:

1. the building is located outside hurricane-prone regions as defined in Section 1609.2,

2. the building is located outside moderate and severe hail exposure regions as defined in Section 1507.1.1 and

3. the building has a minimum fire separation distance of 30 feet.

Vinyl siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

SECTION 1405
INSTALLATION OF WALL COVERINGS

C1405.14 Vinyl Siding. High performance buildings must be designed to more than the minimum when sited in areas subject to high winds, hail damage or fire exposure. This ensures that the buildings will be available for use after these types of events and to minimize damage to the building and its interior. The modifications to Section 1405.14 are to limit buildings from using exterior wall materials with a higher potential to damage from wind and wind-borne debris or hail, such as vinyl siding, when located in the hurricane prone or hail exposure regions. In addition, the use of these exterior wall covering materials are further limited to sites where the building has a fire separation distance of at least 30 feet. This reduces the potential for damage to the building from fire exposure to buildings on adjacent property.

SECTION 1406
COMBUSTIBLE MATERIALS ON THE EXTERIOR SIDE OF EXTERIOR WALLS

[Revise Section 1406.2.1.1 as follows:]

1406.2.1.1 Fire Separation 5 Feet or Less. Combustible ~~materials~~ exterior wall coverings ~~on the exterior side of exterior walls~~ are not permitted ~~Where installed~~ on exterior walls having a fire separation distance or 5 feet (1524 mm) or less ~~combustible exterior coverings shall not exhibit sustained flaming as defined in NFPA 268~~.

[Add new Section 1408.3.1 as follows:]

SECTION 1406
COMBUSTIBLE MATERIALS ON THE EXTERIOR SIDE OF EXTERIOR WALLS

C1406.2.1.1 Fire Separation 5 Feet or Less. Clarifies that combustible materials or coverings cannot be used on buildings with less than 5 feet of fire separation. This requirement will mitigate conflagration between buildings with 5 feet or less fire separation distance.

SECTION 1408
EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)

1408.3.1 Limitations. Exterior insulation and finish systems (EIFS) conforming to the requirements of Chapter 26 shall be permitted on exterior walls of buildings complying with all of the following:

1. The building is located outside of hurricane-prone regions as defined in Section 1609.2.

2. The building is located outside of moderate and severe hail exposure regions as defined in Section 1507.1.1.

3. The building has a minimum fire separation distance of 30 feet.

SECTION 1408
EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

C1408.3.1 Limitations. High performance buildings must be designed to more than the minimum when sited in areas subject to high winds, hail damage or fire exposure. This ensures that the buildings will be available for use after these types of events and to minimize damage to the building and it's interior. The modifications to Section 1408.3.1 are to limit buildings from using exterior wall materials with a higher potential to damage from wind and wind-borne debris or hail, such as exterior insulation finishing systems, when located in the hurricane prone or hail exposure regions. In addition, the use of these exterior wall covering materials are further limited to sites where the building has a fire separation distance of at least 30 feet. This reduces the potential for damage to the building from fire exposure to buildings on adjacent property.

[Add new Section 1409 as follows:]

SECTION 1409
SOLAR REFLECTANCE INDEX

1409.1 General. The provisions of this section shall govern the solar reflectance index (SRI) of exterior wall coverings.

1409.2 Opaque Above Grade Exterior Walls. All opaque portions of above grade exterior walls having an orientation measured perpendicularly to compass directions between and including SSE (157.5º) and WNW (292.5º) shall have a solar reflectance index (SRI) of not less than 29 as determined in accordance with ASTM E1980 for medium wind speed. The SRI shall be based on the thermal emittance determined in accordance with ASTM E408 or C1371 and solar reflectance as determined in accordance with ASTM E1918 or C1549.

Exceptions.

1. Exterior walls having a heat capacity greater than or equal to 5.
2. Exterior walls having an overall thermal resistance greater than or equal to 25 (hr·ºF·ft²)/Btu.
3. Architectural trim that covers less than or equal to 10% of the exterior wall surface area.
4. Exterior walls in Climate Zones 4, 5, 6, 7, and 8 as determined by Section 301 of the IECC.
5. Exterior walls that are at least 75% shaded by building projections, man-made structures, existing buildings, topography, or plantings. Shade coverage shall be calculated on the summer solstice at noon for the SSE to SW walls and 3 pm for the SW to WNW walls.

SECTION 1409
SOLAR REFLECTANCE INDEX

SOLAR REFLECTANCE INDEX Research has shown that materials used on the exterior of buildings can affect the heat gains into the building, thus increasing energy consumption for cooling. To minimize the affects of heat gain, this section places additional limitations on the materials used on the exterior of the walls of a building based on the orientation of the opaque wall. All opaque walls oriented from between SSE (157.5º) and WNW (292.5º) inclusive shall have a solar reflectance index (SRI) of 29.

CHAPTER 15
ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

SECTION 1503
WEATHER PROTECTION

[Add new Section 1503.1.1 as follows:]

1503.1.1 Protection in special wind regions. In regions where the design wind speed determined in accordance with 1609.1.1 is 120 mph or greater, secondary water protection shall be provided for all roofs.

Exception. Roof systems directly applied to concrete decks.

[Modify Section 1503.4.3 and add new Section 1503.4.4 as follows:]

1503.4.3 Gutters. Gutters and leaders placed on the outside of buildings, other than Group R-3, private garages and buildings of Type V construction, shall be of noncombustible material or a minimum of Schedule 40 plastic pipe. Gutter attachment shall be designed and detailed for design wind speeds determined in 1609.1.1

1503.4.4 Roof drain protection. All roof drains on low-slope roofs located in severe exposure areas in Figure 1904.3 shall have heating strips (heat trace) installed around them to prevent blockage of the drains by ice or ice dams

SECTION 1503
WEATHER PROTECTION

C1503.1.1 Protection in special wind regions. High performance buildings must be designed to more than the minimum when sited in areas subject to high winds. This ensures that the buildings will be available for use after these types of events and to minimize damage to the building and it's interior. The modifications to Section 1503.1.1 require building roofs to be provided with secondary water protection to minimize water damage to the interior due to potential damage to roof systems from wind and wind-borne.

C1503.4.4 Roof drain protection. High performance buildings must be designed to more than the minimum when sited in areas subject to severe freezing exposure conditions. The modifications to Section 1503.4.4 require the building roof drain system minimize the effects freezing that may direct water past the drain system and allow water into the building resulting in damage to the interior of the building and its contents.

SECTION 1504
PERFORMANCE REQUIREMENTS

[Modify Section 1504.1 and add Section 1504.1.1 as follows:]

1504.1 Wind Resistance of roofs. Roof decks and roof coverings shall be designed for roof loads in accordance with Chapter 16, 1504.1.1, 1504.2, 1504.3 and 1504.4

1504.1.1 Design wind speed. Roof decks and roof coverings shall have their roof coverings and attachments rated for the design wind speed in 1609.1.1.

Exception: Roof coverings rated for 150 mph are acceptable when the design wind speed determined in accordance with 1609.1.1 exceeds 150 mph but is less than 170 mph.

1504.1.~~1~~2 Wind resistance of asphalt shingles. Asphalt shingles shall comply with Section 1507.2.7.

SECTION 1504
PERFORMANCE REQUIREMENTS

C1504.1 Wind resistance of roofs. High performance buildings must be designed to more than the minimum when sited in areas subject to high winds. This ensures that the buildings will be available for use after these types of events and to minimize damage to the building and it's interior. The changes to Sections 1504.3, 1504.4, 1504.5 and 1504.8 are to add additional performance criteria for roof coverings and their attachment to minimize damage to the roof covering system from these high wind events.

C1504.1.1 Design wind speed. The modifications to Section 1504.1.1 require building roofs to be provided with secondary water protection to minimize water damage to the interior due to potential damage to roof systems from wind and wind-borne debris.

[Modify Section 1504.3 as follows:]

1504.3 Wind resistance of nonballasted roofs. Roof coverings installed on roofs in accordance with Section 1507 that are mechanically attached or adhered to the roof deck shall be designed to resist the design wind load pressures for components and cladding in accordance with Section 1609.

Roof coverings and their attachments installed on low-sloped (roof slope < 2:12) roofs in accordance with Section 1507 shall meet the design and installation requirements of ANSI/SPRI WD-1 or FM Data Sheets 1-28 and 1-29. Low slope roof systems shall be tested in accordance with FM 4450, FM 4470, FM 4471, FM 4474, UL580, or UL 1897.

1504.3.1 Other roof systems. Roof systems with built-up, modified bitumen, fully adhered or mechanically attached single-ply through fastened metal panel roof systems, and other types of membrane roof coverings shall also be tested in accordance with FM 4474, UL 580 or UL 1897. Low slope roof systems shall be tested in accordance with FM 4450, FM 4470, FM 4471, FM 4474, UL580, or UL 1897.

[Modify Section 1504.4 as follows:]

1504.4 Ballasted low-slope roof systems. Ballasted low-slope (roof slope < 2:12) single-ply roof system coverings installed in accordance with Sections 1507.12 and 1507.13 shall be designed in accordance with Section 1504.8 and ANSI/SPRI RP-4 or FM Loss Prevention Data Sheet 1-29.

[Modify Section 1504.5 as follows:]

1504.5 Edge securement for low-slope roofs. Low-slope membrane roof system metal edge securement, except gutters, shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with ANSI/SPRI ES-1 or FM 4435, except the ~~basic~~ design wind speed shall be determined ~~from Figure 1609~~ in accordance with 1609.1.1.

[Modify Section 1504.8 as follows:]

1504.8 Aggregate. Aggregate used as surfacing for roof coverings and aggregate, gravel or stone used as ballast shall not be used on the roof of a building located in ~~a hurricane-prone region as defined in Section 1609.2~~ areas where the design wind speed determined in 1609.1.1 exceeds 120 mph, or on any other building with a mean roof height exceeding that permitted by Table 1504.8 based on ~~the~~ exposure category C and ~~basic~~ the design wind speed at the site.

SECTION 1505
FIRE CLASSIFICATION

[Delete Section 1505.5, Footnotes (b) & (c) from Table 1505.1 Minimum Roof Covering Classification for Type of Construction and add new Section 1505.8]

~~**1505.5 Nonclassified roofing.** Nonclassified roofing is approved material that is not listed as a Class A, B or C roof covering.~~

SECTION 1505
FIRE CLASSIFICATION

FIRE CLASSIFICATION The changes to Section 1505 are to minimize damage to buildings located in areas subject to wildland fires. The changes eliminate the use of non-classified roofs and require roof coverings with a minimum Class A fire classification for all from high performance buildings in areas likely to experience wildland fires (e.g. hot, dry regions).

Table 1505.1
Minimum Roof Covering Classification for Type of Construction[a, ~~b~~]

IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
B	B	B	C[~~e~~]	B	C[~~e~~]	B	B	C[~~e~~]

a. Unless otherwise required in accordance with the *International Wildland-Urban Interface Code* or due to the location of the building within a fire district in accordance with Appendix D.

~~b. Non-classified roof coverings shall be permitted on buildings of group R-3 and group U occupancies, where there is a minimum fire separation distance of 6 feet measured from the leading edge of the roof.~~

~~c. Buildings that are more than two stories above grade plane and having not more than 6,000 square feet of projected roof area and where there is a minimum 10-foot fire separation distance from the leading edge of the roof to a lot line on all sides of the building, except for street and public ways, shall be permitted to have roofs of no. 1 cedar or redwood shakes and no. 1 shingles~~.

1505.8 Roofs in Warm and Dry Climates. Roofs in climate zones 1, 2, 3, 4, 5B (dry), and 6B (dry) of the *2009 International Energy Conservation Code (IECC* shall have a Class A roof covering or Class A roof assembly according to UL 790. For roof coverings where the profile allows a space between the roof covering and roof decking, the space at the eave ends shall be firestopped to preclude entry of flames or embers.

SECTION 1507
REQUIREMENTS FOR ROOF COVERINGS

[Add new Section 1507.1.1 and Figure 1507.1 as follows:]

1507.1.1 Roof coverings subject to hail exposure. Roof coverings used in regions where hail exposure is Moderate or Severe, as determined in accordance with Section 1507.1.1.1 and Figure 1507.1, shall be tested, classified, and labeled in accordance with FM 4473 or UL 2218.

1507.1.1.1 Hail Exposure regions in Figure 1507.1 shall be as follows:

(a) **Moderate -** One or more hail days with hail diameters greater than 1.5 in (38 mm) in a twenty (20) year period.

(b) **Severe -** One or more hail days with hail diameters greater than 2.0 in (50 mm) in a twenty (20) year period.

[Add new Section 1507.16]

1507.16. Roof gardens and landscaped roofs. Roof gardens and landscaped roofs shall comply with the requirements of this chapter and Sections 1607.11.2.2 and 1607.11.3.

Exception: Loads for the design of green roofs shall be permitted to be determined in accordance with ASTM E2397.

[Add new Section 1507.17]

1507.17 Roof Solar Reflectance Index. Roof coverings shall be provided with solar reflectance indices in accordance with the requirements of Section 1507.17.1.1 or 1507.17.1.2. The

SECTION 1507
REQUIREMENTS FOR ROOF COVERINGS

ROOF COVERINGS Consistent with limitations placed on exterior wall coverings in regions of high wind, the changes to Section 1507 are to include additional provisions to protect roofs from damage from hail and high winds. These requirements increase the likelihood the roof coverings will continue to protect the building after an event and minimize the need to replace the roof.

Additional changes are made to conserve energy and reduce the impact from solar heat by specifying minimum solar reflectance indices for the roof coverings. This is similar to the solar reflectance specified for exterior walls in Section 1408. The solar reflectance index required depends on the slope of the roof surface. Low-sloped roofs (i.e. roof slopes < 2-1/2:12) have more stringent requirements since they are more susceptible to direct sunlight.

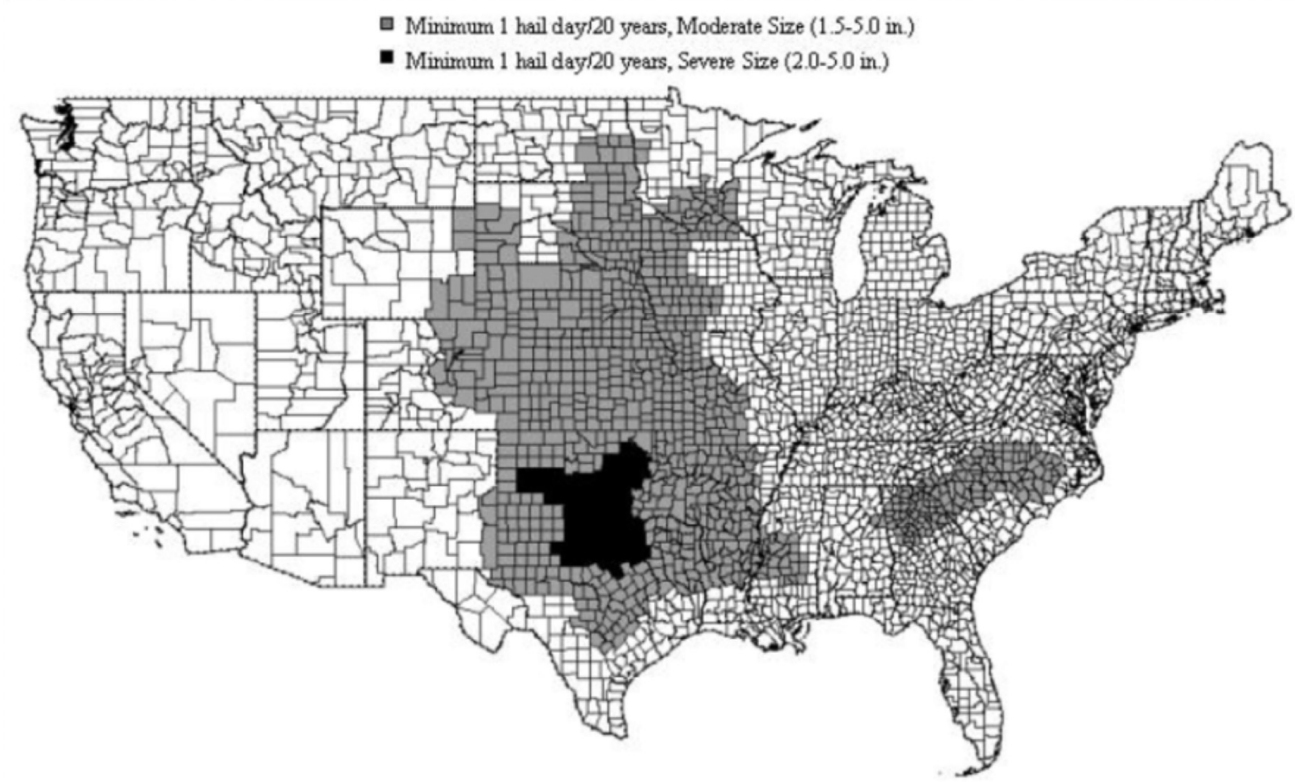

FIGURE 1507.1

roof coverings shall be tested in accordance with ASTM E1980 based on medium wind conditions. The thermal emmittance in accordance with ASTM E408 or C1371 and the solar reflectance in accordance with ASTM E1918 or C1549 shall be used to determine the SRI.

Exceptions.

1. Roof coverings for any of the following conditions
   a. Portions of roofs that are classified as "green"
   b. Portions of roofs covered by on-site renewable energy power systems
   c. Portion of roofs designed with heat capturing building technologies
   d. Portions of roofs covered by rooftop decks or walkways.
2. Up to 10% of the opaque roof area used for architectural and serviceability features.
3. Roofs in Climate Zones 6, 7, and 8 of the IECC.

1507.17.1.1 Roof Slopes < 2-1/2:12. All opaque portions of roofs having a slope less than 2-1/2 units vertical in 12 units horizontal shall have a solar reflectance index (SRI) of not less than 78.

Exception. Roofs with a minimum initial SRI of 29 that shade or cover parking.

1507.17.1.2 Roof Slopes > 2-1/2:12. All opaque portions of roofs having a slope of 2-1/2 units vertical in 12 units horizontal or greater shall have a solar reflectance index (SRI) of not less than 29.

Exception. A default SRI value of 35 for new gray concrete without added color pigment is allowed to be used in lieu of measurements and calculations.

[Add new Section 1511]

SECTION 1511
RAINWATER MANAGEMENT

1511.1 General. Install a green roof or a rainwater harvesting system for at least 25% of the roof area. The rainwater harvesting system shall be designed to reuse water for landscape irrigation or indoor water needs. The storage system shall be sized to hold a minimum of all the water from a 1-in. rainfall event (equivalent to 0.62 gallons per square foot of roof area used for capture).

SECTION 1511
RAINWATER MANAGEMENT

C1511.1 General Managing rainwater that falls on the property for reuse in landscaping maintenance is an effective way to reduce new water demand from the water purveyor on a building site. This new section requires that a system be in place to receive the rainfall that falls on at least 25 percent of the roof surface and store it for reuse. The storage volume must be capable of receiving the amount of rain from a one-inch rainfall.

CHAPTER 16
STRUCTURAL DESIGN

SECTION 1608
SNOW LOADS

[Revise Section 1608.2 as follows:]

1608.2 Ground snow loads. The ground snow loads to be used in determining the design snow loads for roofs shall be equal to 1.2 times the ground snow loads determined in accordance with ASCE 7 or Figure 1608.2 for the contiguous United States and Table 1608.2 for Alaska. Site-specific case studies shall be made in areas designated "CS" in Figure 1608.2. Ground snow loads for sites at elevations above the limits indicated in Figure 1608.2 and for all sites within the CS areas shall be approved. Ground snow load determination for such sites shall be based on an extreme value statistical analysis of data available in the vicinity of the site using a value with a 2-percent annual probability of being exceeded (50-year mean recurrence interval). Snow loads are zero for Hawaii, except in mountainous regions as *approved by the building official*.

SECTION 1608
SNOW LOADS

C1608.2 Ground snow loads. High performance buildings should be expected to withstand higher snow loads that the minimum prescribed by the building code. This change to Section 1608.2 directs the designer to increase the ground snow loads used in the structural design by 20% to improve the robustness of the building.

SECTION 1609
WIND LOADS

[Revise Section 1609.1.1 as follows:]

1609.1.1 Determination of wind loads. Wind loads on every building or structure shall be determined in accordance with Chapter 6 of ASCE 7 or alternate all-heights method in Section 1609.6. The type of opening protection required~~, the basic wind speed and the exposure category~~ for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. The design wind pressure, p, and design wind force, F, determined in accordance with ASCE 7 or 1609.6 shall be based on a design wind speed equal to the basic wind speed (or locally adopted basic wind speed in special wind zones, if higher) plus 20-mph. Component and cladding loads shall be determined for the design wind speed defined assuming terrain Exposure C, regardless of the actual local exposure. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

[Revise Section 1609.1.2 as follows:]

1609.1.2 Protection of openings. In ~~*wind-borne debris regions*~~ regions where the design wind speed determined in accordance with 1609.1.1 is 120 mph or greater, glazing in buildings shall be impact resistant or protected with an impact-resistant covering meeting the requirements of an *approved* impact-resistant standard or ASTM E 1996 and ASTM E 1886 referenced herein as follows:

1. Glazed openings located within 30 feet (9144 mm) of grade shall meet the requirements of the large missile test of ASTM E 1996.

SECTION 1609
WIND LOADS

C1609.1.1 Determination of wind loads. High performance buildings should be expected to withstand higher wind loads that the minimum prescribed by the building code. This change to Section 1609.1.1 directs the designer to increase the wind loads used in the structural design based on the occupancy category determined in accordance with Table 1605 or ASCE 7.

C1609.1.2 Protection of openings. The building code requires openings in the exterior of the building envelope to be provided with impact resistant glazing or impact resistant covers in windborne debris regions to reduce the likelihood that the interior of the building would be damaged due to the opening being breached. Wind borne debris regions are defined in the code as those "portions of hurricane-prone regions that are within 1 mile (1.61 km) of the coastal mean high water line where the basic wind speed is 110 mph (48 m/s) or greater; or portions of hurricane-prone regions where the basic wind speed is 120 mph (53 m/s) or greater; or Hawaii." This modification revises the re-

2. Glazed openings located more than 30 feet (9144 mm) above grade shall meet the provisions of the small missile test of ASTM E 1996.

   Where an impact-resistant covering is used to protect openings located two or more stories above ground, and the opening does not have access from a porch or balcony, the impact- resistant covering shall be permanently installed and shall be operable from inside the building.

[Add new Section 1609.1.3 as follows:]

1609.1.3 Protection of exterior walls. In regions where the design wind speed determined in accordance with 1609.1.1 is 120 mph or greater, exterior walls in buildings shall be impact resistant or protected with an impact-resistant covering meeting the requirements of an approved impact-resistant standard or ASTM 1699 using a 9-pound 2X4 striking end-on at 34 mph without penetration.

gion where opening protection is required to include all areas where the design wind speed exceeds 120 mph. In addition, where impact resistant covers are used to protect the openings in buildings two or more stories in height and the openings are not accessible from a walking surface, the opening protection system must be permanently installed.

C1609.1.3 Protection of exterior walls. The building code requires openings in the exterior of the building envelope to be provided with impact resistant glazing or impact resistant covers in wind-borne debris regions. However, the opaque exterior wall the openings is in is not required to be as resistant to the effects of wind borne debris and thus is subject to damage in a high wind event. This modification revises the code to require exterior walls to meet the same impact resistant requirements as the openings in the wall. This increases the robustness of the exterior envelope of the high performance building.

SECTION 1612
FLOOD LOADS

[Revise Section 1612.4 as follows:]

1612.4 Design and construction. The design and construction of buildings and structures located in flood hazard areas, including flood hazard areas subject to high velocity wave action, shall be in accordance with Chapter 5 of ASCE 7 and with ASCE 24 and the following requirements:

1. **Floors above base flood elevation.** Floors Required by ASCE 24 to be built above the base flood elevations shall have the floor and their lowest horizontal supporting members not less the higher of the following:

   a. design flood elevation,

   b. base flood elevation plus 3 feet, or

   c. advisory base flood elevation plus 3 feet, or

   d. the 500-year flood, if known.

2. **Flood protective works.** Buildings designed and constructed in accordance with ASCE 24 shall not consider levees and floodwalls for providing flood protection during the design flood.

SECTION 1612
FLOOD LOADS

C1612.4 Design and Construction. High performance buildings are expected to perform better in areas subject to flooding. To that end, the changes to Section 1612.4 are twofold. First, the elevation of lowest floor level above the base flood elevation is increased from the level normally considered acceptable to meet minimum requirements. Secondly, Section 1.4.2 of ASCE 24 is modified to prohibit dams, levees, floodwalls, diversions, channels, and other flood protective works from being considered as flood protection for structures during the design flood.

SECTION 1613
EARTHQUAKE LOADS

[Revise Section 1613.1 and add new Section 1613.1.1 as follows:]

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with ASCE 7, excluding Chapter 14 and Appendix 11A. The *seismic design category* for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7. The mapped acceleration parameters determined in accordance with 1613.5.1 shall be used in all designs.

1613.1.1 Near fault sites. Buildings are not permitted to be built on faults, where fault zones (areas subject to severe ground dislocations) have been established and mapped.

[Revise Section 1613.5.1 as follows:]

1613.5.1 Mapped acceleration parameters. The parameters S_S and S_1 shall be determined from the 0.2 and 1-second spectral response accelerations shown on Figures 1613.5(1) through 1613.5(14). Where the ASCE 7-05 mapped 0.2 sec spectral response acceleration parameter, S_S, is greater than or equal to 0.40g, the spectral response acceleration parameters used to design the structure shall be 1.2 times the mapped spectral response acceleration parameters, S_S and S_1. Where S_1 is less than or equal to 0.04 and S_s is less than or equal to 0.15, the structure is permitted to be assigned to *Seismic Design Category* A.

[Add new Section 1613.6.1 as follows:]

1613.6.1 Seismic Design Categories C, D, E and F. If the *seismic design category* is determined to be C, D, E or F, a site specific geotechnical report complying with the provisions of ASCE 7 Section 11.8 is required, and the building shall be designed by a *registered design professional*.

SECTION 1613
EARTHQUAKE LOADS

C1613.1 Scope. This section of the building code specifies that the loads to be used for design of buildings to resist earthquakes shall be based on ASCE 7, *Minimum Design Loads for Buildings and Other Structures*. Building designs using these requirements for high performance buildings are also required to be based on revised mapped acceleration parameters outlined in the modifications to Section 1613.5.1.

C1613.1.1 Near fault sites. Buildings built on known earthquake fault zones have been documented to be at high risk to damage when a seismic event occurs. These provisions for high performance buildings prohibit buildings from being sited where earthquake fault zones have been mapped.

C1613.5.1 Mapped acceleration parameters. The code requires, as a minimum, that buildings be designed according to the mapped acceleration parameters using the 0.2 and 1-second spectral response acceleration maps shown in the code. These maps are based on ASCE 7, *Minimum Design Loads for Buildings and Other Structures*. For high performance buildings located in areas where the spectral response acceleration parameter is greater than or equal to 0.4g, these high performance building requirements specify that the mapped spectral response acceleration parameters be increased by a factor of 1.2 to improve the robustness of the structure and its ability to resist damage from a seismic event.

C1613.6.1 Seismic Design Categories C, D, E and F. If the building design establishes that a building is assigned a Seismic Design Category (SDC) of C, D, E or F, then the high performance building provisions also require the building site to be evaluated and a detailed geotechnical report in accordance with Section 11.8 of ASCE 7 be prepared. The high performance building is also required to be designed by a registered design professional.

CHAPTER 17
STRUCTURAL TESTS AND SPECIAL INSPECTIONS

SECTION 1704
SPECIAL INSPECTIONS

[Add new Item 4 to Section 1704.15 as follows:]

1704.15 Special cases. .....(No change to items 1 through 3)

4. Verification of materials and methods and a review of documentation for conformance with this code, by a third party, shall be permitted to be required by the building official prior to construction.

SECTION 1704
SPECIAL INSPECTIONS

C1704.15 Special cases. Provides for the Building Official to require verification by third-party review.

CHAPTER 18
SOILS AND FOUNDATIONS

SECTION 1805
FOOTINGS AND FOUNDATIONS

[Add new Section 1805.2.1.1 as follows:]

1805.2.1.1 Foundations construction using ASCE 32. All buildings using foundation walls, piers and other permanent supports in accordance with ASCE 32 shall be marked in accordance with all of the following:

1. A placard shall be attached to the building on the front of the structure in the vicinity of the front entrance and in a visible location. Additional placards shall be applied to each side of the structure in a visible location.

2. Building placards shall be 8 inches high by 24 inches long (203 mm by 610 mm) in size with a white background, black letters and a black border. The letters and border shall have easily visible and readable at 10 feet (3048 mm).

3. The placard shall state: *"This building uses insulation materials to protect the foundation from frost heave. Do not disturb any earth within 3 feet of the building without the determining the extent of the insulation protection.*

4. A label shall be affixed to the inside of the main electrical panel with the following statement: *"This building uses insulation materials to protect the foundation from frost heave. Do not shut off power to the building or reduce the interior temperature to the building below 45 °F (7 °C) without determining the impact to the foundation protection.*

[Add new Section 1811.1 as follows:]

SECTION 1811
FOUNDATIONS IN COASTAL ZONES

1811.1 Coastal A Zone. Foundations located in Coastal A Zones determined in accordance with Section 1612.4 shall be designed for the same requirements as foundations located in Coastal V Zones.

SECTION 1805
FOOTINGS AND FOUNDATIONS

1805.2.1.1 Foundation construction using ASCE 32. The code permits foundations that are protected from frost heave to be built to elevations above the frost line. Care must be taken to ensure the integrity of these frost protected shallow foundations (FPSF). To increase the likelihood that a high performance building foundation using FPSF technology is preserved, this section has been added to require signage for the building to bring to the attention of the high performance building code user that such foundation system is in use.

SECTION 1811
FOUNDATIONS IN COASTAL ZONESS

C1811.1 Coastal Zones Buildings built in coastal areas are required to be evaluated for impact from flood loads by Section 1612 of the code. This evaluation also requires the building site be assigned a zone classification based on the exposure to flooding. In coastal areas these zones are identified as Coastal Zone A and Coastal Zone V with Coastal Zone V noted as locations where buildings are at very high risk from wave action or high velocity water while in Coastal A Zones the risk is mostly attributed to rising waters. For high performance buildings the foundation in Coastal Zone A areas must be designed to the same requirements as buildings sited in Coastal V Zones. This requirement improves the robustness of the structure and reduces the risk from flood damage to the building.

CHAPTER 19
CONCRETE

[No additional provisions are required.]

CHAPTER 20
ALUMINUM

[No additional provisions are required.]

CHAPTER 21
MASONRY

[No additional provisions are required.]

CHAPTER 22
STEEL

[No additional provisions are required.]

CHAPTER 23
WOOD

SECTION 2304
GENERAL CONSTRUCTION REQUIREMENTS

[Revise Section 2304.7.2 and add New Section 2304.7.2.1 as follows:]

2304.7.2 Structural roof sheathing. Structural roof sheathing shall be designed in accordance with the general provisions of this code and the special provisions in this section.

Except as required in Section 2304.7.2.1, roof sheathing conforming to the provisions of Table 2304.7(1), 2304.7(2), 2304.7(3) or 2304.7(5) shall be deemed to meet the requirements of this section. Wood structural panel roof sheathing shall be bonded by exterior glue.

2304.7.2.1 Special wind regions. In regions where the design wind speed determined in accordance with 1609.1.1 is 120 mph or greater, structural roof sheathing panels shall be rated for maximum deflection between supports of L/160 when subjected to a uniform live load of 100 pounds per square foot.

[Add new Section 2304.9.1.1 as follows:]

2304.9 Connections and fasteners.

2304.9.1 Fastener requirements. Connections for wood members shall be designed in accordance with the appropriate methodology in Section 2301.2. The number and size of fasteners connecting wood members shall not be less than that set forth in Table 2304.9.1.

C2304.7.2.1 Special wind regions. These high performance building requirements have established increased wind loads for high performance buildings with the modifications to Section 1609.1.1. Consistent with those higher wind loads, the provisions also specify stiffer deflection criteria for wood structural sheathing in the higher wind regions.

2304.9.1.1 Sheathing attachment in special wind regions. In regions where the design wind speed determined in accordance with 1609.1.1 is 120 mph or greater, connections and fasteners of structural roof sheathing panels shall be designed to provide panel resistance uplift with a minimum factor of safety of 2.0 based on a design wind pressure using terrain Exposure C.

C2304.9.1.1 Sheathing attachment in special wind regions. These high performance building requirements have established increased wind loads for high performance buildings with the modifications to Section 1609.1.1. Consistent with those higher wind loads, the provisions also require that connections and fasteners be provided to resist uplift for wood structural sheathing in the higher wind regions.

SECTION 2309
ENDANGERED SPECIES

[Add Section 2309 as follows:]

2309.1 Endangered species. Wood products shall not be produced from endangered species.

Exception: Wood products bearing a label identifying compliance with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

SECTION 2309
ENDANGERED SPECIES

C2309.1 Endangered species. When wood products are used in a building it is important to be sure the wood was harvested properly and does not include any species that are protected or endangered. This requirement was added to bring attention to the code user of the need for proper documentation of the wood product and its place of origin.

CHAPTER 24
GLASS AND GLAZING

[No additional provisions are required.]

CHAPTER 25
GYPSUM BOARD AND PLASTER

[No additional provisions are required.]

CHAPTER 26
PLASTIC

SECTION 2603
FOAM PLASTIC INSULATION

[Revise Exception 2 to Section 2603.3 as follows:]

2603.3 Surface-burning characteristics. Unless otherwise .....(No change to text).....stock for the flame spread index and smoke-developed index.

Exceptions:

1. Smoke-developed index for interior trim as provided for in Section 2604.2.

2. In cold storage buildings, ice plants, food plants, food processing rooms and similar areas, foam plastic insulation where tested in a thickness of 4 inches (102 mm) shall be permitted in a thickness up to 10 inches (254 mm). ~~where the building is equipped throughout with an automatic fire sprinkler system in accordance with Section 903.3.1.1. The approved automatic sprinkler system shall be provided in both the room and that part of the building in which the room is located.~~

(No change to Items 3 through 5)

SECTION 2608
LIGHT TRANSMITTING PLASTIC

[Delete Exceptions to Items 1, 2 and 3 in Section 2608.2 as follows:]

2608.2 Buildings of other types of construction. Openings.....(No change to text).....and all of the following:

CHAPTER 26
PLASTIC

PLASTICS. Chapter 26 provides requirements for the use of plastics in buildings. These plastics take on many forms such as foam plastics used for insulation, interior plastics used for trim and veneers and light-transmitting plastics. These requirements are primarily to reduce the risk of fire spread due to the presence of the plastics within the building. In many cases the code will allow increases in the amount of plastic materials that can be used when the building is sprinklered. Since most high performance buildings contain occupancies where these plastics may be used and will also be provided with automatic sprinkler protection systems the increases in the quantity of plastics due to sprinkler protection is not warranted. The changes in this chapter are to remove these increases in the fire load due to plastic. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

SECTION 2603
FOAM PLASTIC INSULATION

C2603.3 Surface-burning characteristics. Most high performance buildings contain occupancies that will be provided with automatic sprinkler protection systems. These buildings typically use foam plastic insulations. Increases in the quantity of plastic insulation due to sprinkler protection are not warranted and should be removed for high performance buildings. These changes in this section remove these increases in the fire load due to plastic for sprinkler protection. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

SECTION 2608
LIGHT-TRANSMITTING PLASTIC

C2608.2 Buildings of other types of construction. Most high performance buildings contain occupancies that will be provided with automatic sprinkler protection systems. These buildings commonly use light transmitting plastics. Increases in the quantity of plastic allowed, the requirement for flame barriers and

1. The aggregate area of.....(No change to text).....shall not exceed 4 feet (1219 mm).

   ~~**Exception:** Where an automatic sprinkler system is provided throughout in accordance with Section 903.3.1.1, the area of allowable glazing shall be increased to a maximum of 50 percent of the wall face of the story in which it is installed with no limit on the maximum dimension or area of a single pane of glazing.~~

2. Approved flame barriers.....(No change to text).....located in adjacent stories.

   ~~**Exception:** Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

3. Light-transmitting plastics.....(No change to text).....above grade level.

   ~~**Exception:** Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

limitations on height location of the plastics due to sprinkler protection are not warranted and should be removed for high performance buildings. These changes in this section remove these increases in the fire load due to plastic for sprinkler protection. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

SECTION 2609
LIGHT-TRANSMITTING PLASTIC ROOF PANELS

[Revise Sections 2609.1 and 2609.2 as follows:]

SECTION 2609
LIGHT-TRANSMITTING PLASTIC ROOF PANELS

2609.1 General. Light-transmitting plastic roof panels shall comply with this section and Section 2606. Light-transmitting plastic roof panels shall not be installed in Groups H, I-2 and I-3. In all other groups, light-transmitting plastic roof panels shall comply with any one of the following conditions:

~~1. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

~~2~~ 1. The roof construction is not required to have a fire-resistance rating by Table 601.

~~3~~ 2. The roof panels meet the requirements for roof coverings in accordance with Chapter 15.

C2609.1 General. Most high performance buildings contain occupancies that will be provided with automatic sprinkler protection systems. This change removes redundant language from the code. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

2609.2 Separation. Individual roof panels shall be separated from each other by a distance of not less than 4 feet (1219 mm) measured in a horizontal plane.

Exceptions:

~~1. The separation between roof panels is not required in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

~~2~~. The separation between roof panels is not required in low-hazard occupancy buildings complying with the conditions of Section 2609.4, Exception 2 or 3.

C2609.2 Separation. Most high performance buildings contain occupancies that will be provided with automatic sprinkler protection systems. These buildings commonly use light transmitting plastics as roof panels in skylights. Removal of the horizontal distance required between plastic roof panels due to sprinkler protection is not warranted and should be removed for sprinklered high performance buildings. The change in this section removes the exception for sprinkler protection. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

[Revise Section 2609.4 as follows:]

2609.4 Area limitations. Roof panels shall be limited in area and the aggregate area of panels shall be limited by a percentage of the floor area of the room or space sheltered in accordance with Table 2609.4.

Exceptions:

1. ~~The area limitations of Table 2609.4 shall be permitted to be increased by 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

(No change to Items 2 through 4 but renumber)

C2609.4 Area limitations. Most high performance buildings contain occupancies that will be provided with automatic sprinkler protection systems. These buildings commonly use light transmitting plastics as roof panels in skylights. Increasing the area permitted for the plastic roof panels due to sprinkler protection is not warranted and should be removed for sprinklered high performance buildings. The change in this section removes the exception allowing an increase in panel size for sprinkler protection. See HIGH PERFORMANCE FIRE SAFETY, Chapter 4, Page 5.

CHAPTER 27
ELECTRICAL

[Add new Sections 2703 and 2704 as follows:]

SECTION 2703
ELECTRICAL OUTLETS AND RECEPTACLES

2703.1 Type. Electrical outlets and receptacles shall not be designed with push-in type connections located on the back of the outlet or receptacle

2703.2 Installation. Connections between the electrical conductors and the outlet or receptacle shall be made with screw-wired connections in accordance with the manufacturers installation requirements.

SECTION 2703
ELECTRICAL OUTLETS AND RECEPTACLES

C2703.1 Type. Connections other than the push-in type on the back of electrical receptacles provide secure connections.

C2703.2 Installation. Screw-wired connections for electrical receptacles provide secure connections.

SECTION 2704
SURGE PROTECTION

2704.1 Electrical Service. Electrical services shall be protected with a minimum of 80KA surge protection installed in accordance with NFPA 70 and the manufacturers installation instructions

SECTION 2704
SURGE PROTECTION

C2704.1 Electrical Service. This change provides surge protection for the electrical service to the high performance building.

CHAPTER 28
MECHANICAL

SECTION 2802
PARTICULATE MATTER REMOVAL

[Add new Section 2802.1 as follows:]

2802.1 Particulate Matter Removal. Particulate matter filters or air cleaners having a minimum efficiency reporting value (MERV) of not less than 8 when rated in accordance with ANSI/ASHRAE Standard 52.2 shall be provided upstream of all cooling coils or other devices with wetted surfaces through which air is supplied to an occupiable space. HVAC equipment shall be designed and maintained to provide adequate pressure and air flow.

SECTION 2802
PARTICULATE MATTER REMOVAL

C2802.1 Particulate Matter Removal. These provisions are intended to decrease the introduction of foreign materials into the built environment within a building by following the requirements in ASHRAE Standard 52.2, *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size* and specifying a minimum efficiency reporting value (MERV) of 8.

[Add new Section 2803.1 as follows:]

SECTION 2803
HVAC RETURN AIR PLENUMS

2803.1 HVAC return air plenums. Open areas above the ceilings shall not be used as return plenums for HVAC systems. All systems are to have specific inlets and outlets with associated ductwork connected to occupied spaces

SECTION 2803
HVAC RETURN AIR PLENUMS

C2803.1 HVAC return air plenums. Allowing the concealed space above a ceiling to serve as a return air plenums can contribute to fire spread through a building. To reduce this risk of fire spread in a high performance building the return air system in buildings must use solid ductwork in this concealed space.

CHAPTER 29
PLUMBING

[Add new Sections 2903.4 and 3903.5 as follows:]

SECTION 2903
TOILET ROOM REQUIREMENTS

2903.4 Public toilet rooms, janitors closets and utility rooms. Public toilet rooms, janitors closets and utility rooms with water hook-ups shall be provided with floor drains located to readily drain the entire floor area. Such drains shall have a minimum outlet of not less than 3 inches (76 mm) in diameter.

2903.5 Water pipe protection from freezing. Water pipes are shall not be located within exterior wall cavities or unheated spaces in severe exposure areas in Figure 1904.3.

SECTION 2903
TOILET ROOM REQUIREMENTS

C2903.4 Public toilet rooms, janitor closets and utility rooms. Public toilet rooms, janitor closets and utility rooms are often exposed to water during use. This change insures that adequate drains are provided in these spaces to reduce the risk of damage to the room enclosure from water.

C2903.5 Water pipe protection from freezing. Water pipes located in areas subject to freezing are subject to rupture and can cause water damage to buildings. This provision prohibits locating the water piping in wall cavities or unheated spaces if the building is located in areas subject to continuous freezing conditions.

[Add new Section 2904 as follows:]

SECTION 2904
BUILDING WATER USE REDUCTION

2904.1 General. All plumbing fixtures, food service operations, appliances and special water using devices used in the building shall be in accordance with the requirements of the ASHRAE 189.1 Section 6.3.2.

SECTION 2904
BUILDING WATER USE REDUCTION

C2904.1 General. Water is a precious commodity and in the built environment there are extra precautions that can be taken in the management of water use in the building. This section being added refers the user to the requirements in ASHRAE Standard 189.1, *Standard for the Design of High Performance Green Buildings Except Low-Rise Residential Buildings* for minimizing water use. The addition is intended to specify the requirements that must be followed in a high performance building to ensure that water is used in the most efficient manner possible. The provisions in the standard include additional requirements for water using plumbing fixtures, food service equipment, and appliances. In addition there are provisions to assist the code user in the use of ornamental water using fixtures such as fountains, pools, and spas.

[Add new Section 2905 as follows:] .

SECTION 2905
WATER METERING

2905.1 Water metering. The domestic water supply to the building shall be in accordance with the requirements of the ASHRAE 189.1 Section 6.3.3.

SECTION 2905
WATER METERING

C2905.1 Water metering. To further manage the use of water resources this code has provisions to implement water metering requirements to control the amount of water used within high performance buildings. The section added refers the user to the requirements in ASHRAE Standard 189.1, *Standard for the Design of High Performance Green Buildings Except Low-Rise Residential Buildings* for these requirements. The provisions set limits on water use for the building and further require the metering system be designed into sub-metering of individual devices to assist the building owner in determining where the water is portioned in use in the building.

CHAPTER 30
ELEVATORS AND CONVEYING SYSTEMS

SECTION 3004
HOISTWAY VENTING

[Delete Exception 1 to Section 3004.1 as follows:]

3004.1 Vents required. Hoistways of elevators and dumbwaiters penetrating more than three stories shall be provided with a means for venting smoke and hot gases to the outer air in case of fire.

Exceptions:

1. ~~In occupancies of other than Groups R-1, R-2, I-1, I-2 and similar occupancies with overnight sleeping quarters, venting of hoistways is not required where the building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

(Renumber Items 2 through 4)

SECTION 3004
HOISTWAY VENTING

C3004.1 Vents required. The building code requires vents to be installed on hoistways of elevators to vent hot gases to the outside in the event of a fire within the shaft. The code also permits the vent to be eliminated if the building is sprinklered. This change eliminates the exception to venting for sprinklers. See HIGH PERFORMANCE FIRE SAFETY - Chapter 4, Page 5.

SECTION 3005
CONVEYING SYSTEMS

[Add new Section 3005.2.3 as follows:]

3005.2.3 Energy Savings Escalators and moving walkways shall be equipped with the capability to slow down or stop when detectors indicate no traffic within the previous 5 minutes.

SECTION 3005
CONVEYING SYSTEMS

C3005.2.3 Energy Savings. Escalators that run continuously without riders waste energy. To save energy, this section requires escalators in high performance buildings to be equipped with motion detectors to slow down or stop after 5 minutes of inactive use by pedestrians.

CHAPTER 31
SPECIAL CONSTRUCTION

[No additional provisions are required.]

CHAPTER 32
ENCHROACHMENTS INTO THE PUBLIC RIGHT-OF-WAY

[No additional provisions are required.]

CHAPTER 33
SAFEGUARDS DURING CONSTRUCTION

[Add new Sections 3313 and 3314 as follows:]

SECTION 3313
MOISTURE CONTROL

3313.1 General. Control of moisture in materials during construction shall be implemented in accordance with this section.

3313.1.1 Storage and handling. Materials susceptible to damage from moisture exposure shall be protected from moisture during storage, handling and installation.

3313.1.2 Mold on material. Organic materials with visible biological growth shall not be installed on or in the building.

This section is based on ASHRAE 189.1 "*Standard for the Design of High Performance Green Buildings Except Low-Rise Residential Buildings*". Consent to reproduce this section may be obtained from ASHRAE by contacting Steve Comstock, ASHRAE Publisher, at scomstock@ashrae.org.

SECTION 3314
INDOOR AIR QUALITY

3314.1 General. Indoor Air Quality (IAQ) provisions during and following construction shall be implemented in accordance with this section.

3314.1.1 HVAC systems during construction. Cleanliness standards for all HVAC air conveyance elements shall be followed during construction. A cleanliness specification—based on the cleanliness requirements of the building—shall provide details for the storage and covering of air conveyance elements. Permanent HVAC shall never be used during construction and shall be operated for the first time during building "flush-out" and then only after all filters and controls are in place and operational.

3314.1.2 HVAC systems after construction After construction ends and with all interior finishes installed, and prior to occupancy, a building flush-out shall be performed by one of the following methods:

1. Supplying a total air volume of 14,000 ft^3 of outdoor air per ft^2 of floor area (4,300 m^3 of outdoor air per m^2 of floor area) while maintaining an internal temperature of a minimum of 60 °F (15 °C) and relative humidity no higher than 60%.

SECTION 3313
MOISTURE CONTROL

C3313.1 General. The present code is silent on control of moisture from coming into contact with materials that readily absorb the moisture (e.g. fibrous, gypsum and cellulose type materials) while stored on the construction site and before incorporation into the building. It is not uncommon for such materials to be used before the moisture has been reduced to acceptable levels. Mold may even begin growing on the exposed surfaces. The mold may continue to grow and become a health hazard for the occupants if introduced into the built environment. This section is added to put requirements into the code to emphasize the need to protect materials from moisture while stored on site and to prohibit them from being incorporated into the building if visible signs of mold growth are present.

SECTION 3314
INDOOR AIR QUALITY

C3314.1 General. There are no requirements to ensure that mechanical systems are given a complete cleanout prior to being placed into service providing comfort air to the building interior. The result is that airborne foreign matter can be introduced into the built environment resulting in poor indoor air quality. To minimize the effect of newly functioning HVAC equipment this section, based on similar provisions in ASHRAE Standard 189.1, *Standard for the Design of High Performance Green Buildings Except Low-Rise Residential Buildings*, has been added to the code to specify requirements to operate the system in a manner necessary to "flush out" undesirable particulates from the duct system and air handlers before the system is placed into operation with building occupants.

2. If occupancy is desired prior to completion of the flush-out, the space is allowed to be occupied following delivery of a minimum of 3,500 ft^3 of outdoor air per ft^2 of floor area (1,100 m^3 of outdoor air per m^2 of floor area) to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per ft^2 (1.5 L/s per m^2) of outdoor air or the design minimum outdoor airflow rate, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14,000 ft^3 of outdoor air per ft^2 of floor area (4,300 m^3 of outdoor air per m^2 of floor area) has been delivered to the space.

3. Baseline IAQ testing shall be conducted after construction ends and prior to occupancy using testing protocols consistent with the EPA 600/4-90-010. The testing shall demonstrate that the contaminant maximum concentrations listed in Table 3314 are not exceeded. For each sampling point where the maximum concentration limits are exceeded conduct additional flush-out with outside air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat procedure until all requirements have been met. When retesting non-complying building areas, take samples from the same locations as in the first test.

TABLE 3314
MAXIMUM CONCENTRATION OF AIR POLLUTANTS

Contaminant	Maximum Concentration
Formaldehyde	50 parts per billion
Particulates (PM^{10})	50 ppb (50 mcg/m^3)
Total Volatile Organic Compounds (TVOC)	500 ppb (500 mcg/m^3)
4-Phenylcyclohexene (4-PCH)[a]	6.5 ppb (6.5 mcg/m^3)
Carbon Monoxide (CO)	9 ppm and no greater than 2 ppm above outdoor levels

[a] This test is only required if carpets and fabrics with styrene butadiene rubber (SBR) latex backing material are installed as part of the base building systems.

CHAPTER 34
EXISTING STRUCTURES

[No additional provisions are required]

CHAPTER 35
REFERENCED STANDARDS

This chapter lists the standards that are referenced in various sections of this document. The standards are listed herein by the promulgating agency of the standard, the standard identification, the effective date and title, and the section or sections of this document that reference the standard. The application of the referenced standards shall be as specified in Section 102.4.

This document is based on numerous technical resources that have been developed or are in the process of technical review for use in other building regulations and standards for high performance buildings or to improve energy efficiency. Notably, because they are in many different forums, they are not available in a single source location. That is one of the purposes of this High Performance Building Code. It is a compilation of these scattered requirements in one document. The additions to Chapter 35 identify the other sources of material used in whole or part to provide for the regulatory application of this code.

[The following standards are in addition to those in the IBC. Underlining has been omitted for clarity]

ASHRAE

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
1791 Tullie Circle NE
Atlanta, GA 30329
United States
1-404-636-8400;

Standard reference number	Title	Referenced in code section number
ASHRAE/IES Standard 90.1-2007	Energy Standard for Buildings Except Low-Rise Residential Buildings	1303.4.2, 1304.1.2, 1304.1.3
ASHRAE Standard 55-2004	Thermal Environmental Conditions for Human Occupancy	1212
ASHRAE Standard 52.2-2007	Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size	1203.6.1, 1203.6.2, 2802
ASHRAE Standard 62.1-2007	Ventilation for Acceptable Indoor Air Quality	1203.1
ASHRAE/USGB/IES Standard 189.1	Standard for the Design of High Performance Green Buildings Except Low-Rise Residential Buildings	807, 808, 809, 1211, 1303.1, 1303.2, 1303.3 1303.5, 1303.6, 1303.7, 2904.1, 2905.1

ASTM

ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959

Standard reference number	Title	Referenced in code section number
C1371-04	Standard Test Method for Determining Emittance Materials Near Room Temperature Using Portable Emmissometers	1409.2, 1507.17
C1549-04	Standard Test Method for Determining Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer	1409.2, 1507.17
E408-71 (2008)	Standard Test Method for Total Normal Emmittance of Surfaces Using Inspection-Meter Techniques	1409.2, 1507.17
E779-03	Standard Test Method for Determining Air-Leakage Rate by Fan Pressurization	1203.8.2.1, 1403.7.1.1
E1677-05	Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Framed Building Walls	1403.7.1.2
E1680-95 (2003)	Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems;	1403.7.1.2
E1918-06	Standard Test Method for Determining Solar Reflectance of Horizontal and Low-sloped surfaces in the Field.	1409.2, 1507.17
E1980- 01	Standard Practice for Calculating Solar Reflectance Index of Horizontal and	1409.2, 1507.17

	Low-Sloped Opaque Surfaces	
E2178 -03	Standard Test Method for air Permeance of Building Materials	1403.7.1.3
E2397-05	Standard Practice for Determination of Dead Loads and Live Loads Associated with Green Roof Systems	1507.16

CDHS

California Department of Health Services
P. O. Box 997413
Sacramento, CA 95899-7413
United States
1-916-445-4171;

Standard reference number	Title	Referenced in code section number
CA/DHS/EHLB/R-174	Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers	804.5

US EPA

United States Environmental Protection Agency
Atmospheric Research and Exposure Assessment Laboratory
Research Triangle Park, NC 27711
United States
1-919-541-2258; www.epa.gov

Standard reference number	Title	Referenced in code section number
EPA 600/4-90-010, April 1990	Compendium of Methods for the Determination of Air Pollutants in Indoor Air	3314.1.2

USEPA

United States Environmental Protection Agency (USEPA)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460
1-919-541-0800;
Energy Star 1-888-782-7937
WaterSense 1-866-987-7367 and 1-202-564-2660

Standard reference number	Title	Referenced in code section number
40 CFR 50 as amended July 1, 2004	National Primary and Secondary Ambient Air Quality Standards	1203.6.2

[The following appendices are adopted]

APPENDIX F
RODENTPROOFING

The provisions of Appendix F of the International Building Code shall apply.

Appendix F of the *International Building Code* is not applicable unless specifically included by the adopting agency. Appendix F, which provides more detailed requirements for odent proofing a structure than the minimum requirements in the main body of the IBC, is added here to enhance the protection necessary for a high performance building.

APPENDIX G
FLOOD-RESISTANT CONSTRUCTION

The provisions of Appendix G of the International Building Code shall apply.

Appendix G of the *International Building Code* is not applicable unless specifically included by the adopting agency. Appendix G, which provides more detailed requirements for floor resistant construction than the minimum requirements in the main body of the IBC, is added here to enhance the protection from flooding necessary for a high performance building.

[Revise Appendix G Section G1001.6 as follows:]

G1001.6 Protection of mechanical, plumbing and electrical systems. Mechanical, plumbing and electrical systems, including plumbing fixtures and utility connections, shall be elevated ~~to or~~ above the design *flood* elevation. Vertical runs shall be protected by columns or other structural elements that are not part of any break away wall system and shall not be connected to any break away elements.

Exception: Electrical systems, equipment and components, and heating, ventilating, air conditioning, and plumbing appliances, plumbing fixtures, duct systems and other service equipment shall be permitted to be located below the design *flood* elevation provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in compliance with the flood-resistant construction requirements of this code. Electrical wiring systems shall be permitted to be located below the design flood elevation provided they conform to the provisions of NFPA70.

CG1001.6 Protection of mechanical, plumbing and electrical systems. This change provides an additional level of protection to vertical runs of mechanical, plumbing and electrical systems on buildings to prevent damage from floating debris and other objects in areas subject to flooding.

[Add the following new appendices]

APPENDIX L
MATERIAL RESOURCES

This Appendix provides the minimum requirements for material resources. Upon adoption they shall become part of the requirements regulating building sites in conjunction with building code requirements for life safety, property protection, or safety to emergency responders as related to buildings and related structures.

This appendix is intended for adoption by state and local jurisdictions that desire to require minimum requirements for materials resources in their building codes. In many instances, the provisions of this Appendix may be interpreted as being in conflict with the intent of free trade agreements of the World Trade Organization (WTO), of which the United States is a member. Due to this possible interpretation, this information

was not included in the amendments to the main body of the *Building Code*. In jurisdictions that may interpret these requirements as causing such a conflict, design professionals should consider the intent of these provisions in their construction documents, including but not limited to their product specifications.

SECTION L101 GENERAL

L101.1 Scope. The provisions of this appendix shall control the supplementary requirements for material resources used in the construction of high performance buildings.

L101.2 Design. Technical requirements for items herein shall comply with Appendix and the IBC.

L101.3 Materials. The provisions of Sections L104 through L107 are applicable to materials, components, and systems within the scope of the following chapters of the IBC:

L101.3.1 Chapter 8 Interior Finishes,

L101.3.2 Chapter 14 Exterior Walls,

L101.3.3 Chapter 15 Roof Assemblies and Rooftop Structures,

L101.3.4 Chapter 19 Concrete,

L101.3.5 Chapter 20 Aluminum,

L101.3.6 Chapter 21 Masonry,

L101.3.7 Chapter 22 Steel,

L101.3.8 Chapter 23 Wood,

L101.3.9 Chapter 24, Glass and Glazing,

L101.3.10 Chapter 25 Gypsum Wallboard and Plaster, and

L101.3.11 Chapter 26 Plastic.

L101.4 Calculations. All calculations within this appendix are intended to be aggregate of all materials, components, and systems identified in Section L101.3.

SECTION L101 GENERAL

CL101.1 Scope. Identifies that these requirements are in addition to any provisions in the HPBRS

CL101.2 Design. States that the minimum requirements of both this Appendix and those of the *International Building Code*, whichever is more stringent, shall apply in the design and construction of high performance buildings.

CL101.3 Materials. Identifies the building materials addressed by this Appendix. It is generally recognized that building However, building material selection based on occupancy, intended use, design, construction, serviceability, and community impact may account for as much as 15 percent of the total environmental impact of a building. Thus, it is necessary to have provisions related to material resources incorporated into high performance buildings. The decision needs to be made by the appropriate jurisdiction whether it is best for all or some of these requirements to be regulatory, or provided to the architect or engineer, or recorded in the construction documents.

Limits the building materials to those that are specifically addressed in *International Building Code* and have the most significant overall impact on the performance of the structural, finish and cladding materials, components, and systems of the building.

The limitations avoid difficulties encountered in other high performance building efforts where specific items such as controls for HVAC equipment are not available regionally. Further, the limitations address that bulk of the materials used for building construction and allow for more informed decisions on environmental impact for other components. For example, improvements in and availability of specific equipment efficiencies or flow rates for plumbing fixtures may have a more significant impact on overall building performance than satisfying the requirements of this section.

CL101.4 Calculations. Requires that the material resource benefits for high performance buildings be based on the all materials covered by this appendix. Calculations on material resource reduction, material reuse, recycled content, and bio-based materials are determined for all materials defined in Section L101.3. Collectively, considering the impact of all building materials, components, and systems permits the trade-offs that may be necessary to effectively and affordably satisfy the occupancy and use requirements for the building.

This approach does not place a potentially excessive burden on any one building material, component, or system being considered to satisfy the project requirements. The current approach of the calculation of aggregate impact remains consistent with other accepted methods of practice.

Where applicable, a cost-based approach consistent with the approach used in other documents addressing sustainability and high performance buildings is used. More refined approaches may be developed in the future, but the difficulties in tracking and obtaining information needs to be refined. A new approach may be needed to better address the environmental impacts of materials. Basing the provisions on only the cost of materials, components, and systems may not adequately account for differences in use and fabrication. Too, basing the material resource features on cost only may not adequately account for the overall impact of a specific material. For example, there are significant differences in the costs per amount of material when considering steel provided as concrete reinforcing steel versus steel provided as hot-rolled structural steel versus steel provided cold-formed versus steel provided as door frames. The fabrication costs of steel door frames dramatically shifts the weighting of recycled content toward recycled door frames and may not be the most appropriate way to influence environmental impacts for high performance buildings.

SECTION L102
DEFINITIONS

L102.1 General. The following words and terms shall, for the purpose of this appendix and as used elsewhere in this Code, have the meanings shown herein.

DEBRIS, LAND CLEARING—Vegetation and rocks removed from or relocated on the project site.

MATERIALS, RECYCLABLE—Materials that may be recycled multiple times.

MATERIALS REUSED—Salvaged, refurbished, or reused building materials

PRODUCTS, BIO-BASED—Biobased products are products that comply with the minimum biobased contents of the USDA's Designation of Biobased Items for Federal Procurement, contain the "USDA Certified Biobased Product" label, or are composed of solid wood, engineered wood, bamboo, wool, cotton, cork, agricultural fibers, or other biobased materials with at least 50% biobased content.

SECTION L102
DEFINITIONS

CL102.1 General.

MATERIALS, RECYCLABLE—Materials that may only be recycled once or are made from materials that may only be recycled once simply delay final disposal in the landfill once their useful life has be reached. The materials do not need to be recycled back into in their initial form but must be useable as a similar material or component of a material. For example, concrete may not be recycled to reform concrete, but may be crushed as reused as aggregate for new concrete or base under slabs or pavements. Other materials, such as some plastics, may only be recycled once and thus should be avoided in the design and construction of high performance buildings.

PRODUCTS, BIO-BASED—Biobased products are products that comply with the minimum biobased contents of the USDA's Designation of Biobased Items for Federal Procurement, contain the "USDA Certified Biobased Product" label, or are composed of solid wood, engineered wood, bamboo, wool, cotton, cork, agricultural fibers, or other biobased materials with at least 50% biobased content.

PRODUCTS, BIO-BASED WOOD—Biobased wood products are wood building components from sources proven legal and which practice sustainable (environmentally preferable) forest management as verified through accredited, independent, third-party certification bodies and shall contain a minimum of 70% certified wood content. Wood components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. Acceptable forest management certification bodies are those with principles, criteria, and standards developed using ISO/IEC Guide 59 Code of Good Practice for Standardization, or the World Trade Organization (WTO) Technical Barriers to Trade (TBT) Agreement Annex 3 Code of Good Practice for the Preparation, Adoption and Application of Standards.

RECYCLED CONTENT, POST-CONSUMER.—Recycled content of materials used in building construction where recycled materials have been used in previous construction or have otherwise been provided to manufacturer or assemblers after use by consumers.

RECYCLED CONTENT, POST-CONSUMER. Defines post-consumer content for recycle products. Post-consumer applies to products that have been used in a final state in another application. Examples include railroad rails that have been recycled as concrete reinforcing steel; fly ash produced as a result of electric power generation, and concrete aggregate obtained from previously placed concrete on a project site.

RECYCLED CONTENT, PRE-CONSUMER.—Recycled content of materials used in building construction where recycled materials are diverted from the waste stream or are by-products from manufacturing or fabrication processes or excess materials diverted from disposal. Content that shall not be considered pre-consumer recycled includes the re-utilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

RECYCLED CONTENT, PRE-CONSUMER. Defines pre-consumer content for recycled products. These are products made with materials that are generated as the results of a manufacturing process or otherwise have not been used in their final intended form. Examples include cement made for slag and concrete aggregate made from crushed concrete products that were culls or the result of over-runs.

RESOURCE MINIMIZATION – DESIGN.—Elimination of materials used in the building construction as determined by subtracting the cost of modifications of materials used as an alternate to materials that may be eliminated from the building.

RESOURCE MINIMIZATION—DESIGN. Defines a reduction of materials that results from a conscientious effort to minimize materials in the design process. An example is the elimination of a ceramic or concrete tile floor by adding pigments or otherwise finishing an exposed concrete floor to eliminate the need for a finish material or wearing surface.

RESOURCE MINIMIZATION—MANUFACTURE—Elimination, reduction, or replacement of materials used in the manufacture of building materials.

RESOURCE MINIMIZATION—MANUFACTURE. Defines resource minimization that occurs at the point of manufacture. An example is the use of ground limestone in portland cement. Products considered for resource minimization must remain compliant with the appropriate product specification standards or otherwise be addressed in the appropriate construction documents by the architect and/or the engineer of record.

WASTE, CONSTRUCTION—Packaging and excess, damaged, or otherwise unacceptable non-hazardous materials identified in L101.3 Materials. Construction waste shall not include land clearing debris.

WASTE, CONSTRUCTION—This definition is provided to assure that excavated soil and debris from clearing the land is not included as construction waste. The intent of the construction waste management provisions is to minimize the amount of excess or waste building materials from being taken to landfills or being disposed of by incineration.

SECTION L103
STORAGE AND COLLECTION OF RECYCLABLES

L103.1 Collection areas. Collection areas for recyclable materials shall be provided for occupancies identified in Section L103.1.2. Collection areas for both recyclable materials and reusable goods shall be provided for all Residential Group R-2 occupancies. Recyclable materials shall include corrugated cardboard, glass, metals, paper, and plastics. Reusable goods shall include discarded but clean items in a usable or operable condition. Collection areas designated for period pick-up by charitable organizations shall be clearly identified and indicate the name(s) of the participating charitable organization(s).

L103.1.1 Occupancies. The requirements of this section are applicable to use and occupancy classifications: Group A Assembly, Group B Business, Group E Educational, Group I Institutional, Group M, Mercantile, and Group R Residential.

L103.1.2 Frequency. There shall be at least one separate collection area for every 100,000 ft^2 (9,290 m^2) of floor area and no less than one separate collection area for every four stories.

> **Exception:** Group M Mercantile shall be permitted to have one collection area.

L103.1.3 Mixed occupancies. There shall be at least one separate collection area for each portion of a building individually classified in accordance with Section 302.1 of the IBC.

L103.1.4 Compartment protection. Rooms or compartments serving as collection areas shall be designed and constructed as storage areas in accordance with Section L102.2 collection areas shall be designed and constructed in accordance with the provisions of Section 708.13 of the IBC.

L103.1.5 Shaft proteciton. Shafts serving as collection areas shall be designed and constructed in accordance with the provisions of Section 708.13 of the.

L1032.2 Storage areas. Storage areas for recyclables shall be designed and constructed in accordance with the provisions of this section.

SECTION L103
STORAGE AND COLLECTION OF RECYCLABLES

CL103.1 Collection areas. Requires that areas be provided for the collection of recyclable materials generated by the occupancy and use of the high performance building. Activities within high performance buildings must be consistent with general practices related to sustainable development. It is necessary to design and construct acceptable and safe recycling areas for high performance buildings to encourage the operations within buildings that divert solid wastes from landfills and to minimize the overall quantities of virgin materials needed to produce new products.

The U.S. Green Building Council (USGBC) cites that "…recycling one ton of paper prevents the processing of 17 trees and saves three cubic yards of landfill space." USGBC further states: "Recycled aluminum requires only 5% of the energy required to produce virgin aluminum from bauxite…"

CL103.1.1 Occupancies. This section identifies the occupancies that must be provided with collection areas. Group F Factory, Group H High Hazard, and Group S Storage are excluded from these requirements because the amount of waste or type of waste generated may not justify the dedicated space required by the provisions of this section.

CL103.1.2 Frequency. Establishes the minimum frequency for collection areas. Frequency requirements are provided to help assure that collection areas will be sufficiently convenient to accommodate sustainable practices.

Exception: The exception is provided for Group M Mercantile to accommodate large single occupant retail facilities and facilities that house multiple retailers that choose to share a collection area.

CL103.1.3 Mixed occupancies. Requires separate collection areas for each occupancy and use classification within a building containing multiple occupancies. This provision is intended to assure adequate collection facilities for each occupancy and use.

CL103.1.4 Compartment protection. Requires that spaces within the building used for collection of waste have minimum safety requirements. Compartment protection is provided to protect building occupants.

CL103.1.5 Shaft protection. Requires that shafts serving as or servicing collection areas satisfy minimum fire safety requirements consistent with similar provisions of the *International Building Code* for other shafts within the building.

CL103.2 Storage areas. Identifies the minimum requirements for storage areas.

L103.2.1 Interior storage area enclosure. Walls, floors and ceiling systems shall be completely separated from other parts of the building by noncombustible construction having a fire resistance rating of not less than 2-hours and constructed in accordance with Section 706.or 711 of the IBC.

L103.2.2 Interior storage area protection. Interior storage areas shall be equipped with automatic fire extinguishing systems in accordance with NFPA 13.

L103.2.3 Exterior storage areas. Exterior walls of buildings adjacent to exterior storage areas shall be constructed of materials permitted by the building type of construction, but not less than Type I or Type II construction with a 2-hour fire resistance rating shall be used for any portion of the exterior wall that is less than 30 ft (9 m) from the storage area measured vertically and horizontally.

When storage areas are located at a distance of 30 ft (9 m) or more from the exterior wall of the building the exterior wall of the building shall be designed and constructed of materials permitted by the building type of construction.

L103.3 Size of storage and collection areas. Aggregate storage and collection area shall not be less than the area provided in Table L103.3. Any individual storage or collection area shall not be less than 80 ft^2 (7.4 m^2).

CL103.2.1 Interior storage area enclosure. Requires compartmentation for areas within the building used to collect recycled products, which may include paper, cardboard, plastics, and other combustible materials.

CL103.2.2 Interior storage area protection. Requires storage areas within the building to be equipped with automatic fire suppression systems.

CL103.2.3 Exterior storage areas. Provides minimum protection requirements when storage areas are outside the building. When storages areas are positioned more than 30 feet (9 m) from the building, the threat of a fire event that will endanger building occupants or pose damage to the building or its contents is considered to be low. The separation distance is similar to the requirements for other fire safety issues established in the *International Building Code*.

CL103.3 Size of storage and collection areas. Establishes the minimum size of the storage and collection areas. The intent is to assure adequate storage and collection areas to support sustainable practices during building occupancy.

TABLE L103.3[a]
MINIMUM AREA OF COLLECTION AND STORAGE AREAS

Total Building Area in Square Feet	Minimum Collection and Storage Area in Square Feet
5,000 or less	80
More than 5000 up to and including 15,000	125
More than 15,000 up to and including 50,000	175
More than 50,000 up to and including 100,000	225
More than 100,000 up to and including 200,000	275
More than 200,000	500

[a]Source: *New Construction and Major Innovation Versions 2.2 Reference Guide Third Edition*, U.S. Green Building Council, October 2007.

SECTION L104
CONSTRUCTION WASTE MANAGEMENT

L104.1 Diversion. At least 50% measured by weight or volume, but not both, of construction waste shall be diverted from landfills or incineration. Construction waste shall not include land clearing debris or materials excavated at the project site. Specific areas on the project site shall be designated for the collection and storage of construction waste intended to be recycled or salvaged.

SECTION L104
CONSTRUCTION WASTE MANAGEMENT

CL104.1. Diversion. Sets the minimum levels for diverting excess and waste materials for a building to be categorized as high performance.

L104.2 Concealment. Embedding waste materials with wall cavities or other concealed spaces is not permitted.

CL104.2 Concealment. Does not permit placing waste and excess materials within building elements. This practice, often intended to avoid tipping fees or to minimize the amount of waste removed from the site, is considered to simply delay when the materials will be taken to a landfill or disposed of by incineration or other means.

L104.3 Total waste. The total amount of construction waste shall be measured by volume or weight, but not both, and shall not exceed 42 yd^3 or 12,000 lbs per 10,000 ft^2 (35 m^3 or 6000 kg per 1000 m^2) of new building floor area. The amount of construction waste shall be monitored and recorded during the entire construction process.

CL104.3 Total waste. Limits the total amount of construction waste to encourage the use of materials, components, and systems that are efficient use of materials, including but not limited to prefabricated elements.

Exception: These requirements shall not apply when the amount of floor area of existing construction on the project site that is to be deconstructed and/or demolished exceeds 5% of the total floor area of the project.

SECTION L105
MATERIAL REDUCTION, MATERIAL REUSE AND RECYCLED CONTENT

SECTION L105
MATERIAL REDUCTION, MATERIAL REUSE AND RECYCLED CONTENT

L105.1Total material reuse and recycled content factor, MR_T. The minimum total material reuse and recycled content factor shall be 20% based on a weighted average costs of materials satisfying the criteria of this section. The factor for total material reuse and recycled content shall be determined by using Equation L1054.1.

CL105.1Total material reuse and recycled content factor, MR_T. This section requires that a minimum of 20% of the building materials support material reduction, reuse, recycling, or are bio-based. The equation is provided to demonstrate the calculation method applying the adjustment factors to material resource costs as a ratio to the total cost of materials. The costs shall be based on the content of the material that is considered for improving or minimizing material resources. Various reuse and recycled content factors are provided to weight the contribution of the various approaches to have economic, global and society impacts as related to the environment.

L105.1.1. Reused material factor, MR_X. The factor for reused, materials shall be 1.5.

CL105.1.1 Reused material factor, MR_X. For a reused product the cost is equal to the cost of new product that will not be used for the project. For example if there is a total of $20,000 of brick on a project and 50% of the brick are reused from another project, then the cost used in the calculation of the reused material is $10,000 and the cost of brick used to determine the total project cost is $20,000. Material reuse has a high factor of 1.5 because it not only replaces virgin materials but employs previously used materials.

L105.1.2. Recycled content factor, post-consumer, MR_A. The factor for post consumer recycled content materials shall be 1.0. MRA shall only include content that is defined as recyclable materials.

CL105.1.2 Recycled content factor, post-consumer, MR_A. For post-consumer recycled materials the cost is the percentage of the recycled content. For concrete reinforcing steel, 100% of the steel may be recycled and the recycled content cost would be the total cost of the concrete reinforcing steel. Recycled post consumer content has an average adjustment factor as its primary benefit tends to be limited to landfill avoidance while contributing to the reduction of the use of virgin materials.

L105.1.3. Recycled content factor, pre-consumer, MR_B. The factor for pre-consumer recycled content materials shall be 0.5. MRB shall only include content that is defined as recyclable materials.

CL105.1.3 Recycled content factor, pre-consumer, MR_B. For pre-consumer recycled materials the cost is the percentage of the recycled content. For example if a concrete masonry unit manufacturer crushes culls and overruns to produce aggregate to make concrete masonry units, the cost applied to the project would be equal to the replacement cost of virgin aggregate used to produce the new units. Recycled pre-consumer content has a less than average factor because the primary benefits tend to be associated with minimization of virgin materials in the manufacturing process.

L105.1.4. Resource minimization – design, MR_D. The factor for resource minimization as a result of design shall be 1.5.

CL105.1.4 Resource minimization – design, MR_D. For resource minimization accomplished through the design process the cost is determined to be the cost of the materials replaced minus any costs associated with modifications that must be made to other materials. For example, if pigmented concrete floors are used to replace tile of concrete floors the cost would be equal to the costs of the tiles and grout minus the pigments added to the concrete. The resource minimization factor for design is above average because it places an emphasis on eliminating the use of materials.

L105.1.5. Resource minimization – manufacture, MR_M. The factor for resource minimization as a result of manufacturing shall be 1.0.

CL1045.1.5 Resource minimization – manufacture, MR_M. For resource minimization accomplished at the point of manufacturer, the cost is determined to be the difference in cost of 100% of the virgin processed materials minus the reduction or cost of replacement materials. For example a 5% limestone addition to Portland cement would result in a cost reduction equal to 5% of the cost of the Portland cement minus 5% the cost of the integrally ground limestone. The resource minimization factor for manufacture is average because of the potential benefits to the manufacturer as well as the benefits to the project and the environment.

L105.1.6. Bio-based products, MRB_P. The factor for resource minimization for biobased products shall be 1.0.

CL105.1.6 Bio-based products, MRB_P. For bio-based products 100% of the cost of the bio-based products is considered in the calculation procedure. The factor for resource minimization for bio-based is average because the benefits tend to be replacement for other less rapidly produced organic building materials.

L105.2 Multiple environmental benefits. The application of a material for determining multiple content factors shall not be permitted

CL105.2 Multiple environmental benefits. To avoid double dipping, the consideration of a material that satisfies multiple content factors, while encouraged for improved sustainability in design and construction, is not permitted because of the limit set for the total material reuse, and recycled content factor. Consideration may be given to increasing the total material reuse and recycled content factor to accommodate and encourage the use of materials that satisfy multiple content factors.

$$MR_T = \frac{[1.5\ MR_X + 1.0\ MR_A + 0.5\ MR_B + 1.5\ MR_D + 1.0\ MR_M + 1.0\ MR_{BP}]}{MT} \quad \text{Eq. L105.1}$$

Where:
MT = total dollar value of materials
$\mathbf{MR_T}$ = total material reuse and recycled content factor.
$\mathbf{MR_X}$ = total dollar value of materials reused.
$\mathbf{MR_A}$ = total dollar value of post-consumer recycled content
$\mathbf{MR_B}$ = total dollar value of pre-consumer recycled content
$\mathbf{MR_D}$ = total dollar value of material cost savings as a result of eliminating additional materials in the building design.
$\mathbf{MR_M}$ = total dollar value of materials and manufacturing cost savings as a result of materials elimination or replacement excluding materials considered as recycled content.
$\mathbf{MR_{BP}}$ = total dollar value of biobased products.

SECTION L106
INDIGENOUS MATERIALS

L106.1 Indigenous materials. At least 20% of all building materials, based on costs, shall be extracted or harvested; processed; and manufactured within a distance from the project site in accordance with one of the following:

Exception. Building materials transported within 250 miles of the site

1. For building materials having a density of 16 lb per cubic foot (256 kg per cubic meter) or more, no more than 2.5 gallons of diesel fuel per ton (0.01 liters per kilogram) shall be used to transport the materials.

2. For building materials having a density less than 16 lb per cubic foot (256 kg per cubic meter), the maximum amount of diesel fuel shall be determined by volume of material and shall not exceed 0.50 gallons per cubic yard (0.30 kg/m^3). Calculations by volume shall include all packing materials and airspaces required to ship products.

When fuels other than diesel fuel are used for the transport of building materials, the fuel consumption shall be adjusted based on the equivalent Btu content of the fuel or energy. Calculations shall be based on the Btu content of diesel fuel equal to 130,500 Btu per gallon (36.4 mJ/l).

SECTION L106
INDIGENOUS MATERIALS

CL106.1 Indigenous materials. Addresses energy used to transport materials. Similar intent is provided in other approaches to limit environmental impact of transportation for materials being used in a high performance building. The exception is provided to allow a common approach by limiting the distance materials are transported, but such approach does not account for the use of other efficient transportation methods.

The values in Criterion 1 and 2 allow for more efficient alternative methods of transport, such as by rail or barge. The values are based on a typical tractor trailer load traveling 300 miles with a fuel economy of 4 miles per gallon.

Criterion 2 is intended for lighter density materials or materials that require a large volume of air space or lightweight packaging materials. Such materials might be expanded polystyrene (EPS) products such as those used for insulated concrete systems. The number of truck loads to the project site is based on volume for these lightweight materials and not weight. This criterion also considered that EPS blocks used for insulated concrete systems. Blocks used as stay in place insulating concrete forms may have a void area within the blocks that is larger than 30% of the total volume. However, EPS blocks used for alternative insulation strategies may be 100% solid, such as those stacked and covered with a steel reinforcing grid and sprayed on concrete.

Provisions have also been included to provide for fuels other than diesel fuel, including alternative fuels, to be used in transporting the materials. The requirement is limited to the efficiency of the fuel although there may be other environmental benefits of selecting transportation methods that use fuel other than diesel fuel. An example of what is not accounted for is the differences in transport by diesel-electric train versus electric train. The negative environmental impact of diesel-electric is likely to be less than an electric train powered using electric generated at a fossil fuel plant. However, the negative environmental impact of transport by a diesel electric train may be more than an electric train powered using electric generated using green power.

SECTION L107
POLLUTION PREVENTION

L107.1 Pollution Prevention. At least 90% of all building materials must be manufactured using processes and facilities compliant with the clean air, clean water, and pollution prevention regulations of both the country in which the products are used and manufactured. In the United States these are the provisions of the rules and regulations cited in Sections L107.1.1 through L107.1.4. For any jurisdiction for which other rules and regulations may be applicable, the more stringent of the requirement shall apply.

L107.1.1 Clean Air. 40 CFR Parts 50-99

L107.1.2 Clean Water. 40 CFR Parts 100-149

L107.1.3 Conservation. 40 CFR Parts 239-282

L107.1.4 Noise Control. 40 CFR Parts 201-211

SECTION L107
POLLUTION PREVENTION

CL107.1 Pollution Prevention. Sets criteria to minimize the negative environmental impact of manufacturing building materials, components, and systems. Different organizations have taken different approaches to address the issue of air and water pollution, resource conservation, and noise pollution. One approach has been to list materials that are not permitted, such as mercury. This virtually eliminates any fired product or any component or system that contains a fired product because of the likelihood that trace amounts of mercury would be found in fired products. The approach here is to assure pollution is controlled to acceptable levels. Since this Appendix is intended to be used with the ICC *International Building Code* and since most jurisdictions that are adopting the IBC are in the United States, the prevailing laws of the United States were selected for setting the criteria. The goals of the provisions of this section are two-fold. The first is to minimize the amount of pollution and the second is to discourage the use of imported materials where extracting or harvesting, processing, or manufacturing products are less environmentally friendly in an effort to assure that high performance buildings minimize negative global environmental impacts.

CL107.1.1 Clean Air. Specifies that the minimum requirements for air pollution prevention related to extracting or harvesting, processing, and manufacturing materials, components, or systems are in accordance with the United States of America. Air Pollution Control Act (1955); Clean Air Act (1963); Air Quality Act (1967); Clean Air Act (1970) Clean Air Act Extension (1977); and Clean Air Act (1990)

CL107.1.2 Clean Water. Specifies that the minimum requirements for water pollution prevention related to extracting or harvesting, processing, and manufacturing materials, components, or systems are in accordance with the United States of America Federal Water Pollution Control Act (1948); Water Quality Act (1967) Federal Water Pollution Control Act (1972); Clean Water Act Amendments (1977); Clean Water Act Reauthorization (1987).

CL107.1.3 Conservation. Specifies that the minimum requirements for resource conservation related to extracting or harvesting, processing, and manufacturing materials, components, or systems are in accordance with the United States of America Resource Conservation and Recovery Act (CRCA) (1976); CRCA Amendments (1984).

CL107.1.4 Noise Control. Specifies that the minimum requirements for noise control related to extracting or harvesting, processing, and manufacturing materials, components, or systems are in accordance with the United States of America Noise Control Act (1972).

L107.2 Acceptance. Facilities operating with a legal permit in the United States shall be accepted as being compliant. A letter from the manufacturer or design professional certifying compliance shall be accepted as evidence of conformance to this section.

CL107.2 Acceptance. Identifies acceptable methods for the official to determine if the building materials, components, and systems are in compliance with the pollution prevention requirements. Two options are provided. The supplier or manufacturer may provide a letter of compliance stating the facilities involved in extracting or harvesting, processing, and manufacturing are operating with a legal permit. The second option is to have a letter from the architect or engineer of record stating that the building materials, components, and systems specified are compliant. These methods of acceptance are consistent with the methods of acceptance typically used for compliance with building product specification standards.

SECTION L108
REFERENCES

International Code Council (ICC)
4051 West Flossmoor Road
Country Club hills, IL 60478-5795

1. *International Building Code, 2009*

International Organization for Standardization (ISO)
1, ch. de la Voie-Creuse,
Case postale 56
CH-1211 Geneva 20, Switzerland

1. *ISO/IEC Guide 59 Code of Good Practice for Standardization, 1994*

National Fire Protection Association (NFPA)
1 Batterymarch Park
Quincy, Massachusetts
USA 02169-7471

1. *NFPA 13: Standard for the Installation of Sprinkler Systems*

United States Department of Agriculture (USDA)
Office of Energy Policy and New Uses
Room 4059, South Building
1400 Independence Avenue, SW., MS-3815
Washington, DC 20250- 3815

1. *Federal Procurement of Biobased Products*

United States Government Printing Office
732 North Capitol St. NW
Washington, DC 20401

1. *40 CFR Parts 50-99 United States Code of Federal Regulations Title 40 Protection of the Environment, Chapter I, Environmental Protection Agency, Subchapter C Air Programs, Parts 50-99.*
2. *40 CFR Parts 100-149 United States Code of Federal Regulations Title 40 Protection of the Environment, Chapter I, Environmental Protection Agency, Subchapter D Water Programs, Parts 100-149.*
3. *40 CFR Parts 239-282 United States Code of Federal Regulations Title 40 Protection of the Environment, Chapter I, Environmental Protection Agency, Subchapter I Solid Wastes, Parts 239-282.*
4. *40 CFR Parts 201-211 United States Code of Federal Regulations Title 40 Protection of the Environment, Chapter I, Environmental Protection Agency, Subchapter G Noise Abatement Programs, Parts 201-211.*

World Trade Organization (WTO)
Centre William Rappard,
Rue de Lausanne 154,
CH-1211 Geneva 21,
Switzerland.

1. *GATT Basic Instruments and Selected Documents* (BISD)
2. *Technical Barriers to Trade (TBT) Agreement Annex 3 Code of Good Practice for the Preparation, Adoption and Application of Standards*

APPENDIX M
PARKING AREAS AND DRIVES

This Appendix provides the minimum requirements for site development. Upon adoption they shall become part of the requirements for regulating building sites in conjunction with building code requirements for life safety, property protection, or safety to emergency responders as related to buildings and related structures.

SECTION M101
GENERAL

M101.1 Scope. The provisions of this Appendix and Section 801 of the International Zoning Code shall apply to all drives and parking areas. The provisions of this section apply to parking areas intended for personal passenger vehicles.

Exception: The provisions of sections M104 and M105 only apply to parking areas for Group A -Assembly, Group B—Business, Group E – Educational, Group M- Mercantile, and Group R – Residential occupancies and having 50 spaces or more.

SECTION M102
DEFINITIONS

M102.1 General. The following words and terms shall, for the purpose of this appendix and as used elsewhere in this Code, have the meanings shown herein.

CROSS AISLES—Traffic lanes, generally perpendicular to traffic aisles, intended to provide access to traffic aisles.

EFFECTIVE SHADE COVERAGE: the arithmetic mean of the shade coverage calculated on the summer solstice at 10 a.m., 12:00 p.m., and 3:00 p.m.

SOLAR REFLECTANCE: a measure of the ability of a material's surface to reflect sunlight—including the visible, infrared, and ultraviolet wavelengths—on a scale of 0 to 1. Solar reflectance is also called "albedo."

This Appendix is intended for adoption by state and local jurisdictions that desire minimum requirements for site development, a significant component of sustainable construction.These provisions tend not to be within the purview of building code officials because they do not tend to be a priority with regard to or pertain to the life safety, property protection, or safety to emergency responders as related to buildings and related structures. This Appendix might require involvement of other officials or special training of officials for appropriate enforcement.

SECTION M101
GENERAL

CM101.1 Scope. The provisions of this Appendix and Section 801 of the *International Zoning Code* shall apply to all drives and parking areas. The intent of this Appendix is to ensure an ample amount of safe and durable parking areas that do not use an excessive amount of land area.

Exception: This exception for parking areas with less than 50 spaces is to accommodate conditions when parking areas intended primarily for personal passenger vehicles may also be used for deliveries and service vehicles. The exception is also limited to parking areas servicing specific occupancy and use groups. The types of vehicles and vehicle access requirements for Group I – Institutional (emergency vehicles), Groups F – Factory, H-High Hazard, S- Storage, and U- Utility and Miscellaneous (tractortrailer and other trucks) may not be adequately accommodated by the provisions of this Appendix. The concepts of limiting parking space and area size should be addressed in the design of each specific facility within these occupancy and use groups. The provisions are intended for personal passenger vehicles used to transport residents, employees, and visitors to the building. Personal passenger vehicles include, but are not limited to, automobiles, mini-vans, sport-utility vehicles, and light trucks.

SECTION M102
DEFINITIONS

CM102.1 General.

TABLE M103.1
MAXIMUM NUMBER OF PARKING SPACES

Use and Occupancy Classification		Spaces per Unit
Group A – Assembly		
A-1		0.3 Spaces per Seat
A-2		0.3 Spaces per Seat
A-3	Places of Worship	0.4 Spaces per Seat
A-3	Other than Places of Worship	No Maximum Requirements
A-4	Arena	0.3 Spaces per Seat
A-4	Other than Arenas	No Maximum Requirements
A-5	Bleachers/Grandstands/Stadiums	0.3 Spaces per Seat
A-5	Amusement Park Structures	No Maximum Requirements
Group B – Business		
B	All except Colleges, Universities and Vocational Schools	4.0 per 1000 Sq. Ft. of Gross Floor Area
B	Colleges and Universities and Vocational Schools above 12th Grade	0.5 per Student plus 1.0 per faculty member
Group E – Educational		
E	Senior High Schools	0.2 per Student plus 1.0 per faculty member
E	All Other Educational below 12th Grade	1.0 per 3.5 seats plus 1.0 per faculty member
Group F – Factory		
F-1, F-2	Moderate-hazard and Low-hazard factory	0.6 per Employee
Group H – High Hazard		
H-1, H-2, H-3, H-4, H-5		0.6 per Employee
Group I – Institutional		
I-1	Residential board, care facilities, assisted living, halfway houses, group homes, congregate care facilities, social rehabilitation, alcohol and drug facilities, convalescent facilities	1.2 per Bed
I-2	Hospitals, nursing homes, mental hospitals and detoxification facilities	1.2 per Bed
I-3	Prisons, jails, reformatories, detention centers, correctional centers, prerelease centers	0.3 per Bed plus 1.0 per Staff
I-4	Day care facilities	0.5 per Occupant
Group M - Mercantile		
M		6.0 per 1000 Sq. Ft. of Gross Floor Area
Group R - Residential		
R-1	Boarding houses, hotels and motels	1.0 per sleeping unit plus 1.0 per 250 sq ft of common area
R-2	Apartment houses, convents, dormitories, fraternities and sororities, monasteries, vacation time shares and non-transient boarding houses, hotels and motels.	1.0 per Bedroom
R-3	Residential occupancy not classified as R-1, R-2 or R-4	1.0 per Bedroom
R-4	Residential care/assisted living facilities for more than five but not more than 16 occupants, excluding staff	1.0 per Bedroom
Group S – Storage		
S-1, S-2	Moderate-hazard and Low-hazard storage	0.6 per Employee

SOLAR REFLECTANCE INDEX (SRI): a measure of a material surface's ability to reject solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is 0 and a standard white (reflectance 0.80, emittance 0.90) is 100.

TRAFFIC AISLES—Traffic lanes between rows of parking spaces intended to provide access to individual parking spaces. This Appendix provides the minimum requirements for site development. Upon adoption they shall become part of the requirements for regulating building sites in conjunction with building code requirements for life safety, property protection, or safety to emergency responders as related to buildings and related structures.

SECTION M103
NUMBER OF PARKING SPACES

M103.1 Minimum parking spaces. The number of parking spaces shall not be less the number provided in Table 801.2.1 Off-Street Parking Schedule of Chapter 8 of the International Zoning Code (IZC).

M103.2 Maximum parking spaces. The number of parking spaces shall not exceed the larger of the number of spaces required in Section M103.1 and provided in Table M-103.1.

SECTION M103
NUMBER OF PARKING SPACES

CM103.1 Minimum parking spaces. The ICC *International Zoning Code* specifies the minimum number of parking spaces required by occupancy and use classification.

CM103.2 Maximum parking spaces. A maximum number of parking spaces are provided for parking areas at high performance buildings. These limits are intended to restrict the use of available land for parking and encourage carpools and alternative means of transportation. The maximum number of parking areas is not to be less than required in Section M103.1. When the minimum number of spaces determined using Section M103.1 is more than the number of spaces determined using Table M103.1, the total number of parking spaces shall be less than the number determined by using Section M103.1. For example, consider a hotel with 80 sleeping rooms and 5,000 square feet of common area. Using Table 801.2.1 of the *International Zoning Code*, the minimum number of spaces shall be one per sleeping room or 80 plus one for every 500 square feet of common area or 10 additional spaces. The total minimum number of spaces is 90. Using Table M103.1, the maximum number of spaces is also one per sleeping room or 80 spaces but can be as much as one per 250 square feet of common area or 20 for a total of 100 spaces. For this example, the number of spaces should not be less than 90 and not more than 100.

SECTION M104
TRAFFIC AISLES

M104.1 General. The provisions of this section are applicable for parking areas for Group A – Assembly. Group B – Business, Group E- Educational, Group M- Mercantile, and Group R – Residential having 50 or more parking spaces and more than two traffic aisles.

M104.2 Number of traffic aisles. When there are multiple rows of parking spaces, traffic aisles shall serve 2 rows for parking.

SECTION M104
TRAFFIC AISLES

CM104.1 General. The geometry is such that there is little or no reduction in land use attributed to altering the configuration of parking areas with less than 50 parking spaces.

CM104.2 Number of traffic aisles. Limits the number of traffic aisles for parking areas. It is intended to minimize the land area used for parking areas by avoiding the use of traffic lanes servings one row of parking spaces.

M104.3 Width of traffic aisles. Traffic aisles shall not exceed 26.0 ft (7.9 m) in width.

CM104.3 Width of traffic aisles. Prescribes the maximum traffic aisle width. The width limitation is intended to minimize the total area used as parking area while providing the access to parking spaces positioned at an angle of 90 degrees measured from the direction of the traffic aisle. For large rectangular parking areas, the use of angled parking spaces will reduce the amount of surface area required for the same number of spaces because the width of the traffic aisles may be reduced. However, since a parking area layout is often site-specific, no provisions for parking space angles are provided in this Appendix.

M104.4 Width of cross aisles. Cross aisles shall not exceed 24.0 ft (7.3 m) in width.

CM104.4 Width of cross aisles. Limits the width of cross aisles. The maximum width of cross aisles is intended to limit the total area used as parking area. The frequency of cross islands should be kept to a minimum, but the parking area layout is often site-specific and there are thus no provisions for the number of cross aisles provided in this Appendix. To minimize parking area space, the number of cross aisles could be limited to two.

SECTION M105
PARKING SPACES

SECTION M105
PARKING SPACES

M105.1 General. The provisions of this section are applicable for parking areas for Group A – Assembly. Group B – Business, Group E- Educational, Group M- Mercantile, and Group R – Residential having 50 or more parking spaces.

CM105.1 General. The geometry is such that there is little or no reduction in land use attributed to altering the configuration of parking areas with less than 50 parking spaces. The geometry of the parking spaces for areas intended for vehicles other than automobiles and light trucks are not addressed in this Appendix.

M105.2 Parking space width. Parking spaces shall not exceed 9.0 ft (2.7 m) in width.

CM105.2 Parking space width. Limits the width of parking spaces. The intent is to maximize the density of parking spaces in the parking area.

Exceptions

1. Spaces designated for handicapped, vanpools or other high occupancy vehicles, or refueling or charging alternative fuel vehicles.

Exceptions:

1. Provided to accommodate handicapped vehicles and to encourage means of transportation other than personal passenger vehicles. This exception allows for wider parking spaces to accommodate handicapped, vanpools, or for refueling or recharging alternative fuel vehicles

2. Parking spaces for Group M Use and Occupancy Classifications shall not exceed 10.0 ft (3.0 m) in width.

2. Allows 10-foot wide parking spaces for mercantile facilities. The intent is to allow sufficient space to load and unload goods into vehicles.

3. The width of the parking space shall be increased 10 in. (25 mm) for obstructions located on either side of the space within 14 ft (4.3 m) of the access aisle.

3. Allows for a parking space width increase to allow for obstructions. Obstructions may be light standards, walls, fences, etc.

M105.3 Parking space length. Parking spaces shall not exceed 22.0 ft (6.7 m) in length.

CM105.3 Parking space length. Limits the length of parking spaces and is intended to optimize the number of useable parking spaces in the parking area.

Exception:

Spaces designated for handicapped, vanpools or other high occupancy, or refueling or charging alternative fuel vehicles.

Exception:

Allows for longer parking spaces to accommodate handicapped, vanpools, or for refueling or recharging alternative fuel vehicles.

SECTION M106
PAVEMENT STRENGTH AND THICKNESS

M106.1 Minimum strengths and thicknesses. The thickness of bases and wearing surfaces shall be in accordance with the requirements of this section.

Exception:

The provisions of this section are not applicable to parking garages.

M106.1.1 Portland cement concrete pavements. Concrete shall have a compressive strength of at least 4,000 psi (27580 kPa) and Portland cement concrete pavement thickness shall not be less than 4.0 in. (100 mm). Pavement thickness shall be determined in accordance with ACI 330R.

Note: A base is not required for Portland cement concrete pavements but untreated aggregate bases are typically installed for constructability.

M106.1.2 Asphalt concrete surface on asphalt concrete base. Asphalt concrete surface mixtures shall be Type SS-1 in accordance with *Model Construction Specification for Asphalt Concrete and Other Plant-Mix Types*. And the surface layer thickness shall not be less than 1 in. (25mm) Asphalt Concrete Base shall Type I emulsified asphalt mixes made with processed dense-graded aggregates meeting the requirements of *A Basic Asphalt Emulsion Manual* (MS-19). Thickness of asphalt of the asphalt concrete base shall not be less than 3 in. (75 mm) and the surface and base layer thicknesses shall be designed in accordance with *Asphalt Pavement Thickness Design*.

M106.1.3 Asphalt concrete surface on untreated aggregate base. Asphalt concrete surface mixtures shall be Type SS-1 in accordance with *Model Construction Specification for Asphalt Concrete and Other Plant-Mix Types*. And the surface layer thickness shall not be less than 1 in. (25 mm) asphalt concrete base shall Type I emulsified asphalt mixes made with processed dense-graded aggregates meeting the requirements of *A Basic Asphalt Emulsion Manual* (MS-19). Thickness of the asphalt concrete base shall not be less than 2 in. (50 mm). The aggregate

SECTION M106
PAVEMENT STRENGTH AND THICKNESS

CM106.1 Minimum strengths and thicknesses. This section requires minimum design criteria for pavements used as parking areas and drives. These requirements do not tend to be life safety related but set a minimum level of performance and durability for pavements on the sites of high performance buildings. The requirements are consistent with accepted industry practice. These requirements may be viewed has having similar need to be addressed in the Code as minimum design and construction requirements for slab-on-grade construction within buildings

This Appendix is currently limited to the minimum design requirements for portland cement concrete and asphalt concrete pavements. Additional provisions for interlocking clay paver and concrete paver pavements may be appropriate.

Exception:

Parking garages are excluded from these requirements and the requirements for the design of parking garages are addressed in the ICC *International Building Code*.

CM106.1.1 Portland cement concrete pavements. Prescribes the minimum strength for concrete and minimum thickness of concrete intended for use in parking areas and drives. The design requirements are consistent with accepted industry practice to ensure a minimum level of serviceability.

CM106.1.2 Asphalt concrete surface on asphalt concrete base. Prescribes the mixture and minimum pavement thickness for asphalt concrete intended for use in parking areas and drives. The design requirements are consistent with accepted industry practice to ensure a minimum level of serviceability.

CM106.1.3 Asphalt concrete surface on untreated aggregate base. Prescribes the mixture and minimum thickness of asphalt concrete intended for use in parking areas and drives. The design requirements are consistent with accepted industry practice to ensure a minimum level of serviceability.

for the untreated aggregate base shall comply with ASTM D2940 and the thickness of the untreated aggregate base shall not be less than 4 in. (100 mm) Asphalt concrete parking areas and drives on untreated aggregate base shall be designed in accordance with the provisions set forth in *Asphalt Pavement Thickness Design*.

M106.1.4 Interlocking concrete pavements. Interlocking concrete pavements subject to vehicular traffic shall be surfaced with minimum 3-1/8 inch (80 mm) thick concrete paving units whose materials conform to ASTM C936. Paver configuration paver pattern, untreated or treated pavement materials and thickness, bedding materials and thickness shall be designed in accordance with ASCE/T&DI 58. Aggregate for untreated aggregate bases shall comply with ASTM D2940 and shall have a thickness of not less than 4 in. (100 mm).

M106.1.4 Interlocking concrete pavements. This section prescribes the minimum thickness and product specifications for concrete pavers and aggregate bases.

SECTION M107
HEAT ISLAND EFFECT

SECTION M107
HEAT ISLAND EFFECT

M107.1 Mitigation of heat island effects. Methods addressed in this section are required to mitigate heat island effects.

CM107.1 Mitigation of heat island effects. Provides options to minimize the heat island effects related to parking areas and drives. Those options include:

- Shading using plantings and other on-site buildings
- The pavements with minimum solar reflectance indices (SRI)
- Pervious pavements

M107.2 Solar reflectance index, SRI. The SRI shall be determined in accordance with ASTM E1980 for medium wind speed. The SRI shall be based on the thermal emittance determined in accordance with ASTM E408 or C1371 and solar reflectance as determined in accordance with ASTM E1918 or C1549.

CM107.2 Solar Radiation Index. Identifies the acceptable methods for determining the solar radiation index of the pavement surface.

M107.3 Heat island mitigation methods. Parking areas and drives shall be provided with not less than 50% of the heat island mitigation methods in Sections M107.3.1, M107.3.2 and M107.3.3, either individually or in any combination

Exceptions:

1. Cover parking areas
2. Parking garages
3. Parking areas and drives where the entire paved surface has a solar reflectance index (SRI) of at least 18.

CM107.3 Heat island mitigation methods. This section prescribes the minimum requirements for heat island mitigation methods for parking areas excluding covered parking, parking garages and parking areas where the entire surface area has a solar reflectance index of at least 18.

M107.3.1 Shading. The effective shade coverage shall be the arithmetic mean of the shade coverage at 10 a.m., 12:00 p.m., and 3:00 p.m. on the summer solstice. Shading shall be provided in accordance with Sections M107.3.1.1 and M107.3.1.2.

CM107.3.1 Shading. Allows heat island effect mitigation to be addressed with shading.

M107.3.1.1 Plantings. Plantings that are native and adapted plants shall be permitted as shading. Shade calculations shall be based on anticipated growth within five years after the certificate of occupancy is issued. Trees selected shall be capable of having a 15 ft (4.6 m) minimum crown radius within five years of issuance of final certificate of occupancy. Selection and location of plantings shall be such that root growth does not have deleterious effects on the hardscapes or the building foundation and the requirements of Section 101.4.7 Wildland Fires are satisfied.

CM107.3.1.1 Plantings. Allows shading by biodiverse plantings to be used as a heat island effect mitigation technique.

M107.3.1.2 Structures. Topography or permanent structures on the building site or campus shall be permitted to provide shading to the site.

CM107.3.1.2 Structures. Allows shading by buildings and other structures on the site or campus to be used as a heat island effect mitigation technique.

M107.3.2 Solid pavements. Solid pavement surfaces with a minimum initial solar reflectance index (SRI) of 29 shall be permitted.

CM107.3.2 Solid pavements. Permits the use of the solar reflectance of solid pavement surfaces to be used as a heat island effect mitigation technique.

Exception. New concrete surfaces without added color pigments shall be considered to have a SRI value of 35

M107.3.3 Pervious pavements. Pervious pavements including open grid paving systems with a minimum percolation rate of 2 gal. per minute per square foot (100 L/min.m^2) and a minimum of 6 inches (150 mm) of open graded base below the pavement or pavers shall be permitted.

CM107.3.3 Pervious pavements. Permits pervious pavement to be used as a heat island effect mitigation technique. Minimum requirements for the pervious pavement are provided. The design requirements of this section are intended to assure adequate percolation and minimum storage.

SECTION M108
FIRST FLUSH

SECTION M108
FIRST FLUSH

M108.1 First flush volume. The volume of the first flush shall be calculated as 1/4 –in. (6 mm) of precipitation falling on all or draining onto impervious surfaces of parking areas and drives. The first flush shall be accommodated by any one or combination of the methods permitted in this section.

CM108.1 First flush volume. Requires that the first flush of rainfall be collected and stored or treated on site. These requirements are provided to aid in keeping oil, brake fluid, lubricants, transmission fluid, etc., from vehicles on the site and not be transferred directly to wetlands and bodies of waters as runoff or via storm sewers. In addition, these requirements allow water collected on pavements to reach a temperature close to ambient temperature before being released to wetlands and bodies of water that may serve as habitats. Several options for compliance are provided.

M108.1.1 Treatment. Collect and treat first flush volume on site prior to releasing off site, including release to storm sewers.

CM108.1.1 Treatment. Allows water treatment to be used as an Option to control the quality of the water contained in the first flush.

M108.1.2 Retention. Collect and retain first flush in a water retention pond or ponds.

CM108.1.2 Retention. Allows water retention to be used as an option to control the quality of the water contained in the first flush.

M108.1.3 Percolation. Collect and retain first flush using pervious pavement..

CM108.1.3 Percolation. Allows percolation, including the use of pervious pavements, to be used as an option to control the quality of the water contained in the first flush.

M108.1.3.1 Location. Pervious pavement shall be adjacent to the down slope edge or edges of impervious surfaces.

CM108.1.3.1 Location. Places requirements on the location of the impervious surfaces intended to collect and retain first flush.

M108.1.3.2 Collection. Collection volume of pervious pavement shall be considered to be 50% of the total volume of pervious pavement. Open graded base for pervious pavements shall be permitted to be included in the calculation of the storage volume of the pervious pavement.

Exception: Pervious pavement intended only for collection of the first flush does not need to satisfy the minimum 6 in. (150 mm) open graded base provisions of Section M107.3.3.

CM108.1.3.2 Collection. Sets the minimum area of pervious pavement required to accommodate the first flush. This section also permits the use of pervious pavement used for water retention to also serve as a collection area for the first flush.

Exception. Permits the design of pervious pavement exclusively for collection of the first flush. Such requirements do not have the same storage volume as pervious pavement intended for retention. While pervious pavements designed to the minimum requirements for water retention may also be considered as serving as pervious pavement for collection of the first flush, pervious pavements designed to the requirements less than the minimum requirements for water retention may not be used in the calculation of pervious pavement area for heat island effect mitigation.

SECTION M109
LIGHTING

M109.1. Minimum lighting. Lighting requirements for parking areas and drives shall comply with the provisions of this section.

M109.1.1 Normal security and access. Where lighting is used to provide security and access in parking areas and on drives, the minimum lighting levels shall be in accordance with the Illuminating Engineering Society of America IESNA RP-33-99.

M109.1.2 Low security areas. Areas where lighting levels do not meet the minimum lighting requirements of Illuminating Engineering Society of America IESNA RP-33 shall be permitted if clearly identified as areas of potentially higher security risk. Low security areas shall not exceed one half the total parking area.

M109.1.3 Surface reflectance. Surfaces of all lighted parking area and drives shall have a minimum total surface reflectance, Q_0, of not less than 0.09.

M109.2 Light trespass. Light trespass restrictions shall be in accordance with Table M109.1.

SECTION M109
LIGHTING

CM109.1 Minimum lighting. Identifies requirements appropriate for minimizing lighting loads necessary to light parking areas and drives.

CM109.1.1 Normal security and access. Generally minimum lighting requirements are necessary for the use of specific parking areas and for both safety and security. Many approaches for sustainable development require reductions in lighting loads that may not be consistent with the intent of the lighting, especially the minimum lighting levels required for safety and security.

CM109.1.2 Low security areas. Permits the use of lighting levels that are below the levels required for use, safety, and security; however, such areas must be clearly designated that may not be adequately lit for safety and security. Areas lit in such a manner are restricted in size as not being larger than 50 percent of the total parking area.

CM109.1.3 Surface reflectance. Prescribes a minimum surface reflectance for parking areas. This approach is intended to optimize the lighting load to obtain the necessary lighting levels without jeopardizing safety and security.

CM109.2 Light trespass. Sets limits for the amount of artificial light that may fall on adjacent properties. These requirements assist in obtaining the design of optimized lighting systems and help preserve the habitats of nocturnal animals.

TABLE M109.1[a]
MAXIMUM ILLUMINANCE PERMITTED FOR LIGHT TRESPASS

Properties Adjacent to Site	Maximum Illuminance			Maximum Fixture Lumens Emitted at an Angle or 90 Degrees or More from Nadir.
	Maximum Vertical and Horizontal Footcandles at Site Boundary	Beyond Site Boundary		
		Maximum Horizontal Footcandles	Distance Beyond Site Boundary, in Feet	
LZ1 - Parks, Agricultural or Undeveloped Areas	0.01	Not Permitted		0%
LZ2 - Residential (One and two family dwellings)	0.10	0.01	10	2%
LZ3 – All Adjacent Properties Not Defined as LZ1,LZ2 or LZ4	0.20	0.01	15	5%
LZ4 – Exterior Illuminance on Adjacent Site Exceeds Maximum Requirements of LZ3.	0.60	0.01	15	10%

[a]Source: *New Construction and Major Renovation Version 2.2 Reference Guide*, Third Edition, U.S. Green Building Council, October 2007

SECTION M110
REFERENCES

American Concrete Institute
38800 Country Club Dr.
Farmington Hills, MI 48331 USA

1. ACI 330R-08 *Guide for Design and Construction of Concrete Parking Lots*

American Society of Civil Engineers (ASCE)
Transportation and Development Institute (T&DI)
1801 Alexander Bell Drive
Reston, VA 20191-4400

1. *ASCE T&DI 58-10 Standard Structural Design of Interlocking Concrete Pavement for Municipal Streets and Roadways*

American Society for Testing and Materials International (ASTM)
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959

1. *ASTM C936–09 Standard Specification for Solid Concrete Interlocking Paving Units*
2. *ASTM C1371 - 04a Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers*
3. *ASTM C1549.- 04 Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer*
4. *ASTM D2940 – 03 Standard Specification for Graded Aggregate Material for Bases and Subbases for Highways and Airports*
5. *ASTM E408 - 71(2008) Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques*
6. *ASTM E903 - 96 Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres*
7. *ASTM E1918 - - 06 Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field*

International Code Council (ICC)
4051 West Flossmoor Road
Country Club hills, IL 60478-5795

1. *International Zoning Code, 2009*

The Asphalt Institute
2696 Research Park Drive
Lexington, KY 40511-8480

1. *A Basic Asphalt Emulsion Manual* (MS-19).
2. *Asphalt Pavement Thickness Design*, 1981
3. *Model Construction Specification for Asphalt Concrete and Other Plant-Mix Types (SS-Does something need to be added?)*

Illuminating Engineering Society of North America (IESNA)
120 Wall Street, Floor 17
New York, NY 10005-4001

1. *IESNA RP 33-99 Recommended Practice Manual: Lighting for Exterior Environments*

U.S. Green Building Council
1800 Massachusetts Ave, N.W. Suite 300
Washington, DC 20036

1. New Construction and Major Renovation Version 2.2 Reference Guide, October 2007

APPENDIX N
RADON MITIGATION

This Appendix is intended for adoption in jurisdictions where radon migration into buildings has been determined to be at levels that warrant radon mitigation strategies.

RADON MITIGATION. High performance buildings could be located in areas where the presence of radon gas in the soils may be high enough to be of concern to the health of building occupants and should be addressed in the design. The addition of Appendix N is intended to bring to the attention of the building code user the need to determine if the area where the building will be sited is prone to radon migration into the building and to implement strategies to protect the building. The provisions are targeted to those types of buildings where the exposure presents the greatest risk to the occupants such as Group A-Assembly, Group B- Business, Group E-Educational, Group I-Institutional, and Group R-Residential.

SECTION N101
RADON RESISTANT CONSTRUCTION

N101.1 General. Buildings having the use and occupancy classifications of Group A Assembly, Group Business B, Group E, Educational, Group I, Institutional or Group R, Residential shall comply with the requirements in this section.

Exception. Buildings complying with one of the following radon resistant construction techniques for new construction:

1. Chapter 2 of EPA 625-R-92-016.
2. Appendix F of the IRC

N101.1.1 Active soil depressurization, ASD. Employ a soil depressurization system by requiring compliance with sections N101.1.1 through N101.1.5:

N101.1.1.1 Aggregate base – Install a continuous minimum 4-in. (100 mm) layer of clean aggregate under the slab.

N101.1.1.2 Eliminate barriers – Eliminate barriers that will restrict air flow through the clean aggregate. When sub-slab walls that restrict air flow are used, install a radon suction pit in each area separated by sub-slab walls.

N101.1.1.3 Radon suction pit – Install a radon suction pit that is a minimum 4-ft by 4-ft by 8-in. deep (1.2 m by 1.2 m by 200 mm deep) consisting of clean aggregate under the slab.

N101.1.1.4 Vent pipe – Install a minimum 6 in. (150 mm) diameter vent pipe from the radon suction pit to the outdoors. Exhaust vents shall be located no less than 25 ft (7.6 m) from all entrances, air intakes, operable windows, and exterior public access areas.

SECTION N101
RADON RESISTANT CONSTRUCTION

CN101.1 General. Radon mitigation requirements are added to the requirements for high performance buildings. This section prescribes the occupancies where radon mitigation measures are most needed.

CN101.1.1 Active soil depressurization, ASD. The provisions specify minimal requirements using active soil depressurization methods though other means such as the Environmental Protection Administration *Guide to Radon Prevention in the Design and Construction of Schools and Other Large Building or the International Code Council International Residential Code* are also acceptable

N101.1.1.5 Fan. Install a suction fan design for use in active soil depressurization (ASD) systems.

N101.1.2 Sealing. Seal major radon entry routes.

SECTION N102
REFERENCES

Environmental Protection Agency (EPA)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

1. *EPA 625-R-92-016 Guide to Radon Prevention in the Design and Construction of Schools and Other Large Buildings, 3rd Printing with Addendum*, June 1994.

International Code Council (ICC)
4051 West Flossmoor Road
Country Club hills, IL 60478-5795

1. *IRC International Residential Code, 2009*

APPENDIX O
SITE SELECTION

This Appendix provides the minimum requirements for selection of sites for site development. Upon adoption they shall become part of the requirements for regulating building sites in conjunction with building code requirements for life safety, property protection, or safety to emergency responders as related to buildings and related structures.

SECTION O101
GENERAL LAND USE

O101.1 General. Buildings, hardscapes, roads, or parking areas shall not be constructed on sites or portions of sites defined in section O101.1.1 through O101.1.7

O101.1.1 Prime farmland. Land defined as prime farm land in 7 CFR 657.5.

O101.1.2 Flood plains. Previously undeveloped land with an elevation lower than 5 ft (1.5 m) above the elevation of the 100-year flood as defined by the Federal Emergency Management Agency (FEMA). [Should there be more guidance here and if so what?]

O101.1.3 Threatened or endangered species habitat. Land identified as habitat for any species on the Federal or State threatened or endangered species list.

O101.1.4 Wetlands. Wetlands as defined by 40 CFR, Parts 230-233, 40 CFR Part 22 and isolated wetlands or areas of special concerned identified by the authority having jurisdiction.

O101.1.5 Land adjacent to wetlands. Land within 100 ft (30.5 m) of wetland or within setback distances from wetlands as defined by the state or local authority having jurisdiction, whichever is larger.

O101.1.6 Land adjacent to bodies of water. Land within 50 ft (15.2 m) of a body of water defined as seas, lakes, rivers, streams and tributaries which support or could support fish for recreational or industrial use in 40 CFR Part 328.

O101.1.7 Parks and preserves. Land which prior to acquisition was public parkland.

SITE SELECTION. While many site related criteria in sustainable building documents are not within the purview of the building department and often not within the purview of the jurisdiction provisions that may be addressed by most AHJs are provided here. These criteria are in an appendix because they may be regulated by other agencies within the jurisdiction or may not be within the purview of the building code department. This Appendix is intended for adoption by jurisdictions intending to restrict site development. The jurisdiction may find that these provisions are more suitable for modification of the regulations related to zoning and land use.

SECTION O101
GENERAL LAND USE

CO101.1 General. Restricts where buildings, hardscapes, roads, parking areas, or other permanent structures may be placed on sites. The intent of these restrictions is to preserve farmland, flood plains, threatened and endangered species habitats, wetlands, bodies of water, parklands, and preserves.

O101.1.7.1 Exception. Public parkland may be acquired and used for development if land of equal or greater value as parkland is accepted in trade by the public landowner.

O101.1.7.2 Exception. Park authority projects.

SECTION O102 DEFINITIONS

O102.1 General. The following words and terms shall, for the purpose of this ~~A~~appendix, have the meanings shown herein. Refer to Chapter 2 for general definitions.

DEVELOPMENT. Any man-made change to improved or unimproved real estate, including but not limited to, buildings or other structures, temporary or permanent storage of materials, mining, dredging, filling, grading, paving, excavations, operations and other land disturbing activities

CO101.1.7.1 Exception. Permits the use of parkland to be developed if an equal or greater value of parkland is provided elsewhere.

CO101.1.7.2 Exception. Allows the park authority to erect facilities on parkland.

SECTION O102 DEFINITIONS

CO102.1 General. Provides definitions applicable to general land use requirements.

TABLE O103.1
MAXIMUM DISTANCE OF DISTURBANCE[a]

Distance in Feet (m)	Measured From
40	Building Perimeter
40	Retaining Walls Intended to Maximize Development Density
25	Stormwater Detention Facilities
25	Pervious Pavements
25	Playing Fields
25	Other Areas Constructed with Pervious Surfaces
15	Roadway Curbs
15	Main Utility Branch (12 inches or more in diameter) Trenches
15	Retaining Walls and Other Hardscapes
10	Walkways
10	Patios
10	Parking Surfaces
10	Utility Line (less than 12 inches in diameter) Trenches

[a]Source: *New Construction and Major Renovation Version 2.2 Reference Guide*, Third Edition, U.S. Green Building Council, October 2007

SECTION O103
HABITAT PROTECTION

O103.1 Greenfields. On greenfield sites and portions of previously developed sites that were undisturbed limit construction disturbance as not to exceed the distances provided in Table O102.1

O103.2 Previous developed sites. Restore or protect 50% of the site area excluding the building footprint with native or adaptive vegetation

SECTION O104
OPEN SPACE

O104.1 General. Provide vegetated open space that is not less than the minimum open space required by the local zoning ordinance and exceeds the larger of:

1. 20% of the total project site area or

2. total building footprint.

SECTION O103
HABITAT PROTECTION

CO103.1 Greenfields. Sets requirements to limit the amount of disturbance that may occur when developing a greenfield site.

CO103.2 Previous developed sites. Requires restoration of existing sites intended to be used for high performance buildings.

SECTION CO104
OPEN SPACE

CO104.1 General. This section provides the minimum requirements for open space on sites intended for high performance buildings. Two criteria are reviewed for compliance. Option one is related to the project site and option two is related to the building footprint. The high performance building site must meet the larger of the two criteria.

SECTION O105
REFERENCES

Federal Emergency Management Agency
500 C Street SW
Washington, D.C. 20472

1. *National Flood Insurance Program (100 year flood elevation maps)*

United States Government Printing Office
732 North Capitol St. NW
Washington, DC 20401

1. *7 CFR Parts 400-699 United States Code of Federal Regulations, Title 7 Agriculture, Volume 6, Parts 400-699.*
2. *16 CFR Parts 1531-1544 United States Code of Federal Regulations Title 16 Conservation, Chapter 35 Endangered Species, Parts 1531-1544*
3. *38 CFR Part 328 United States Code of Federal Regulations Title 33 Navigation and Navigable Waters, Chapter II Corps of Engineers, Department of the Army, Department of Defense, Part 328 Definitions of Waters of the United States.*
4. *40 CFR Part 22 United States Code of Federal Regulations Title 40 Protection of the Environment, Chapter I Environmental Protection Agency, Part 22.*
5. *40 CFR Part 136 United States Code of Federal Regulations Title 40 Protection of the Environment, Chapter I Environmental Protection Agency Subchapter D Water Programs Part 136 Guidelines Establishing Test Procedures for the Analysis of Pollutants..*
6. *40 CFR Part 230-233 United States Code of Federal Regulations Title 40 Protection of the Environment, Chapter I Environmental Protection Agency, Parts 230-233.*

U.S. Green Building Council
1800 Massachusetts Ave, N.W. Suite 300
Washington, DC 20036

1. *New Construction and Major Renovation Version 2.2 Reference Guide, October 2007*

APPENDIX P
FORCED ENTRY RESISTANCE

This Appendix provides the minimum requirements for forced entry resistance. Upon adoption they shall become part of the requirements for regulating building sites in conjunction with building code requirements for life safety, property protection, or safety to emergency responders as related to buildings and related structures

SECTION P101
GENERAL

P101.1 Scope. The provisions of this appendix shall control the supplementary requirements for security and burglary resistance.

P101.2 Design. Technical requirements for items herein shall comply with this Appendix and the IBC.

SECTION P102
EXTERIOR DOORS

P102.1 Exterior Doors. The provisions of this section shall apply to all entry doors.

Exception. Garage doors and roller doors.

P102.1.1 Wood Doors. Wood doors shall meet the requirements of this Section.

P102.1.1.1 Thickness. Wood doors shall be solid core and have a minimum thickness of 1-3/4 inch (45 mm)

P102.1.1.2 Escutcheon Plate. Where dead bolts are present, wood doors shall have an escutcheon plate at the dead bolt.

Exception. Escutcheon plates are not required for wood doors with steel edges.

P102.1.2 Steel Doors. Steel doors, frames, and hardware reinforcing shall meet the performance Level 3 (Extra Heavy Duty) requirements of ANSI/SDI A250.8,

P102.1.3 Glass Doors. Glass doors and portions of glazing in doors shall meet the requirements of performance level L3 of ASTM E2395

This Appendix is intended for adoption by state and local jurisdictions that desire to require minimum security requirements for enhanced burglary resistance. Satisfying the minimum security requirements is intended to result in increased occupant comfort and productivity.

SECTION CP101
GENERAL

CP101.1 Scope. Identifies that these requirements are in addition to any provisions in the Ordinance for High Performance Buildings.

CP101.2 Design. States that the minimum requirements of both this Appendix and those of the International Code council (ICC) International Building Code (IBC), whichever is more stringent, shall apply in the design and construction of high performance buildings.

SECTION CP102
EXTERIOR DOORS

CP102.1 Exterior Doors. These provisions are applicable to all exterior doors used to access the building.

Exception. The primary intent of these requirements is to provide resistance to forced entry by prying and as such the provisions are not applicable to roller or garage doors.

CP102.1.1 Wood Doors. Minimum requirements for wood doors are provided.

CP102.1.1.1 Thickness. The minimum thickness provided is recommended by the Institute for Business and Home Safety (IBHS) as the minimum requirement for forced entry resistance.

CP102.1.1.2 Escutcheon Plate. The escutcheon plate requirements are recommended by the Institute for Business and Home Safety as the minimum requirements for forced entry resistance

Exception. Steel edge for wood doors in steel frames satisfies the minimum requirements for forced entry resistance recommended by the Institute for Business and Home Safety.

CP102.1.2 Steel Doors. Level 3 is recommended as the minimum requirement for forced entry resistance by the Institute for Business and Home Safety.

CP102.1.3 Glass Doors. Level 3 is recommended as the minimum requirement for forced entry resistance by the Institute for Business and Home Safety.

P102.2 Deadbolts. Except where prohibited by IBC requirements for panic and fire exit hardware, install ANSI/BHMA A156.5 Grade 1 deadbolt locks with a minimum 1 inch (25 mm) long throw at all exterior doors.

CP102.2 Deadbolts. The Institute for Business and Home Safety recommends that dead bolts be provided on all exterior walls other than those required in the International code Council (ICC) *International Building Code* (IBC) to have panic or fire exit hardware. Studies made in the development of security and forced entry resistance standards at the American Society for Testing and Materials (ASTM) advise that deadbolt do not pose a insurmountable threat to emergency responders.

P102.2.1 Deadbolts and Wood Door Frames. Reinforce wood door frames with a steel or aluminum reinforcing plate at each deadbolt lock strike plate. The strike plate shall be attached with a minimum (4) 3-inch (75 mm) long screws to the reinforcing plate. The reinforcing plate shall extend at least 12 inches (300 mm) above and below the deadbolt lock location and be attached with a minimum (8) 3-inch (75 mm) long screws to the building wall framing.

CP102.2.1 Deadbolts and Wood Frame Doors. The Institute for Business and Home Safety recommends minimum requirements for deadbolts used in wood doors in wood frame wall construction.

SECTION P103
FRAME CONSTRUCTION

P103.1 Hinge Installation. For wood jambs, install hardwood shims at all hinge locations and every 2 feet (600 mm) on each jamb and install hinges with minimum 3-inch (75 mm) long screws.

P103.2 Bracing. For wood and steel stud construction, reinforce the walls on both door jambs with horizontal framing members for the three stud spaces next to the door opening. Bracing shall occur on both sides of openings and not be less than one bracing system at the height of all hinges, deadbolts, and latches. Each bracing system shall be installed within 3 inches (75 mm) measured vertically of all hinges, deadbolts, and latches and placed between 3 consecutive stud spaces adjacent to the door frame.

SECTION P103
FRAME CONSTRUCTION

CP103.1 Hinge Installation. Minimum requirements to shim jambs are recommended by the Institute for Business and Home Safety to resist twisting or dislodging the jamb to breach the deadbolt or hinges.

CP103.2 Bracing. In constructions erected with wood and metal studs, bracing is required so the fame wall cannot be forced away from the door and permit a breach of the deadbolt or hinges. The bracing members are installed much like horizontal purlins for three stud spaces. Bracing requirements are the minimum forced entry protection level recommended by the Institute for Business and Home Safety.

SECTION P104
WINDOWS

P104.1 Windows. Windows shall meet the requirements for Grade 20 in ASTM F588.

SECTION CP104
WINDOWS

CP104.1 Windows. This is the minimum recommendation by the Institute for Business and Home Safety for forced entry resistance

SECTION P105
SECURITY ALARMS AND MONITORING

P105.1 Forced Entry Alarms. Install a security alarm system with contacts at all operable windows, exterior doors, doors between garage and living space, and on garage doors within 8 feet of grade level or construction elements that are scalable.

P105.2 Glass Break Alarms. Install glass break detectors for all ground floor windows. A minimum of one glass break detector shall be installed for each area with exterior fenestration and interior isolated by floor to ceiling walls or partitions.

SECTION CP105
SECURITY ALARMS AND MONITORING

CP105.1 Forced Entry Alarms. This section, consistent with the recommendations of the Institute for Business and Home Safety, requires that first floor levels of all operable windows and doors for building are equipped with security alarms.

CP105.2 Glass Break. All areas with fenestration at on ground floors are required to be equipped with glass break alarms which is consistent with the recommendations of the Institute for Business and Home Safety.

P105.3 Strobe/Audible Alarm. Install a strobe/audible alarm on the exterior of the building facing the street or more visible location and in a place that cannot be easily accessed from the ground.

CP105.3 Strobe/Audio Alarm. The section provides the minimum recommendation of the Institute for Business and Home Safety for visual and audio alerts.

P105.4 Monitoring. Security alarm system shall be capable of being monitored 24 hours a day 7 days a week.

CP105.4 Monitoring. Consistent with the minimum recommendations of the Institute for Business and Home Safety, all alarm systems shall have the capability of being monitored at a central monitoring location. Such monitoring may be on site or remote.

P105.5 Exterior Lighting. Install outdoor security lighting to conform to the IESNA G-1.

CP105.5 Exterior Lighting. Lighting requirements are the minimum recommended by the Institute for Business and Home Safety and supersedes any provisions on exterior lighting provided in M109 Lighting is Appendix M is adopted by the authority having jurisdiction.

SECTION P106
MERCANTILE OCCUPANCIES

SECTION CP106
MERCANTILE OCCUPANCIES

P106.1 Storefronts. Glass storefronts shall be in accordance with the requirements of Section P106.1.1 or P106.1.2.

CP106.1 Storefronts. Storefronts susceptible to "smash and grab" theft. These requirements are consistent with the minimum recommendations of the Institute for Business and Home Safety for forced entry and impact resistance.

P106.1.1 Glass. Storefront glass shall meet the requirements for Ballistic Criteria HG4 and Forced Entry Sequence of Testing Class II of ASTM F1233.

CP106.1.1 Glass. Combined ballistic and forced entry testing is not required.

P106.1.2 Shutters and Grilles. Storefront glass area shall be protected with security shutters or grilles.

CP106.1.2 Shutters and Grilles. Shutters or grilles may be employed as an alternative to impact and ballistic resistant glazing assemblies.

P106.2 Bollards. Storefronts are protected accessible to vehicular traffic shall be protected with permanent or retractable bollards design and constructed to meet the requirements of an M30 Rating per ASTM F2656.

CP106.2 Bollards. Where smash and grab theft may be accomplished with a vehicle, bollards are required, consistent with the minimum forced entry resistance requirements recommended by the Institute for Business and Home Safety.

SECTION P107
REFERENCES

American Society for Testing and Materials
100 Barr Harbor Drive
West Conshohocken, PA 19428

1. ASTM E2395-06 *Standard Specification for Voluntary Security Performance of Window and Door Assemblies with and without Glazing Impact*.

2. ASTM F588-07 *Standard test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact*.

3. ASTM F1233-07 *Standard Test Method for Security Glazing Materials and Systems*.

4. ASTM F2656-07 *Standard Test Method for Vehicle Crash Testing of Perimeter Barriers*

Builders Hardware Manufacturers Association
355 Lexington Avenue, 15th floor
New York, NY 10017

1. ANSI/BHMA A156.5-01 *Standard for Auxiliary Locks and associated Products*.

Illuminating Engineering Society of North America
120 Wall Street, Floor 17
New York, NY 10005-4001

1. IESNA G-1-03 *Guideline on Security Lighting for People, Property, and Public Spaces*

Steel Door Institute
30200 Detroit Road
Westlake, Ohio 44145

1. ANSI/SDI A250.8) *Standard Steel Doors and Frames*.

ABOUT THE CONTRIBUTORS

Stephen S. Szoke, S.E., P.E., IOM, LEED/AP, CDT
Director, Codes and Standards
Portland Cement Association

Steve Szoke is a registered structural engineer in Washington, DC and registered civil engineer in Virginia. He is a Leadership in Energy and Environmental Design Accredited Professional and a Construction Specifications Institute Construction Document Technologist. Steve has chaired the technical committee and board of direction and has become an honorary member of the Sustainable Building Industries Association (SBIC). He has and continues to participate in environmental and energy conservation standards development, primarily through the American society for Testing and Materials (ASTM) and American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE).

His past and present involvement in ASTM include work on the advancement of standards in ASTM E05 on Fire Standards; ASTM E06 on Performance of Buildings; and ASTM E54 on Homeland Security Applications in addition to ASTM E44 on Solar Energy Conversion; ASTM E50 on Environmental Assessment, Risk Management and Corrective Action; and ASTM E60 on Sustainability. His work in ASHRAE has focused primarily on ASHRAE 90.1 *Energy Standard for Buildings Except Low-Rise Residentia*l; ASHRAE 90.2 *Energy Efficient Design of Low-Rise Residential Buildings;* and the ASHRAE Handbooks.

Steve directs the Portland cement industries programs related to national model building codes and referenced standards, focusing on International Code Council (ICC) and National Fire Protection Association (NFPA) documents. He initiated efforts to incorporate thermal mass credits in the Council of American Building Code Officials (CABO) Model Energy Code, and a similar form of these credits continue to be present in the ICC *International Energy Conservation Code*.

Steve continues to work on the advancement of sustainable building design and construction through multiple industry activities such as the recent High Performance Building Council report to Congress coordinated by SBIC and the National Institute of Building Sciences for the US Department of Energy.

Steve chairs the Sustainable Development Task Group of the Masonry Alliance for Codes and Standards (MACS) and serves on the Sustainability Committee of the Alliance for Concrete Codes and Standards (ACCS). Since his initial involvement in whole building construction in 1978, he has published several papers and articles on energy conservation and environmental aspects of building construction, continuing to encourage combined whole building, whole project, and community impact approaches to sustainable development.

Stephen V. Skalko, P.E.
Manager, Regional Codes and Standards
Portland Cement Association

Steve Skalko is a registered engineer in Georgia in the disciplines of civil engineering and fire protection engineering. He has been involved in codes and standards for over twenty five years first as a Building Official and Fire Marshal for a local government jurisdiction and now as a representative of the Portland Cement Association. He participates in codes and standards development through the International Code Council (ICC), the National Fire Protection Association (NFPA), the American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE), the American Society of Civil Engineers (ASCE) and American Society for Testing and Materials (ASTM).

As a former code official he served on the Southern Building Code Congress, International (SBCCI) Standard Building Code Development Committee and also represented SBCCI on the CABO *One and Two Family Dwelling Code* (OTFDC) and the *Model Energy Code* (MEC) Development Committees. He also has served on the *International Energy Conservation Code* (IECC) Development Committee.

His involvement in ASHRAE includes serving on ASHRAE Standing Standard Project Committees (SSPC) responsible for development of ASHRAE 90.1 *Energy Standard for Buildings Except Low-Rise Residentia*l and ASHRAE 90.2 *Energy Efficient Design of Low-Rise Residential Building*. He participates not only as a committee member but presently serves as Vice Chair of the SSPC 90.1 Full Committee. Previously he served as Chair of the Envelope Subcommittees for SSPC 90.1 and SSPC 90.2 and as Chair of the SSPC 90.2 Full Committee.

ASTM activities includes work on the advancement of standards in ASTM E05 on Fire Standards and ASTM E06 on Performance of Buildings. For ASCE Steve serves on the committee responsible for development of ASCE 32, *Design and Construction of Frost-Protected Shallow Foundations*.

William (Jay) Hall, C.B.O
Codes Specialist
Portland Cement Association

Jay Hall is a certified Building Code Official and Fire Code Official through the *International Code Council* (ICC) and the Commonwealth of Virginia. A former Virginia State Fire Marshal, Jay currently serves on the ICC Fire Safety Code Development Committee, several technical committees of the National Fire Protection Association (NFPA) and as a committee member for the *Society of Fire Protection Engineers Standards Making Committee on Predicting the Thermal Performance of Fire Resistive Assemblies*. He has and continues to participate in the development of national fire safety codes and standards promoting redundancy in active and passive fire protection mandated by building codes and standards.

Jay works in concert with the Portland cement industries programs related to national model building codes and referenced standards, focusing on International Code Council (ICC) and National Fire Protection Association (NFPA) documents.

Since his initial involvement in 1995, as a building codes regulator in local government, Jay has participated in the development of both national and local codes and standards as a Building Official, Fire Official, State Fire Marshal and now as a representative of private industry. He promotes the inclusion of functional resiliency as related to fire safety in building codes to protect lives and property and to minimize negative impacts on communities that may result from loss of employment, housing, and community resources.