Wood Use Provisions in the 1999 SBC and 2000 IBC

Code Conforming Wood Design

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Expanding the Use of Wood Construction:
A Comparative Analysis

2000 ICC *International Building Code*
and the
1999 SBCCI *Standard Building Code*

**Development of the International Building Code**

The publication of the 2000 Edition of the *International Building Code (IBC)* (1) marked the end of regional code development by Building Officials and Code Administrators, International (BOCA), Southern Building Code Congress International (SBCCI), and International Conference of Building Officials (ICBO). The publication of the *IBC* signals a new era in model construction codes. The publication of the *IBC* by the International Codes Council completes the family of national model construction codes developed cooperatively by the three model code organizations.

In 1994 the three regional model code organizations created the International Code Council (ICC), a nonprofit organization dedicated to developing a single set of comprehensive and coordinated national model construction codes. The goal of the ICC was to have the new family of national model construction codes available by the year 2000 and they have met this goal. And, so, in 1996 work began on the creation of the *IBC*, developed primarily from the provisions of the three nationally recognized model building codes: the BOCA *National Building Code (NBC)* (2) promulgated by BOCA, *Standard Building Code (SBC)* (3) promulgated by SBCCI, and *Uniform Building Code (UBC)* (4) promulgated by ICBO. The model code organizations agreed that once the 2000 *IBC* was published, no further editions of their own codes would be maintained. In accordance with this agreement, ICBO published the last edition of the *UBC* in 1997, while BOCA and SBCCI halted publication of their codes after 1999.

The *IBC* is a comprehensive code and the coordinating document for the suite of I-Codes. In certain instances, *IBC* provisions are identical to those of the three regional model codes. In other instances, the provisions are a modification of requirements from one or more of the three regional model codes. Some provisions are entirely new and unique to the *IBC*.

**About this Document**

This document highlights some of the differences between the 1999 *SBC* and the 2000 *IBC* for wood products application and design. It is one of a series of three publications that compare the *IBC* to each of the three model codes. The intent is to highlight the traditional opportunities for wood in the *SBC* and the corresponding provision of the *IBC*. Where significant provisions of the *IBC* are identical or similar to those of the *SBC*, this fact is noted. Where provisions are significantly different, a comparison is provided.

The format of this document will assist the reader in applying the information contained herein to the actual text of the code. For that reason the various sections of this brochure are titled to correspond with the code chapters to which they apply. Chapter subject matter and number in the *IBC* are the same as in the *SBC* since both are based on the common code format utilized by the three model code organizations. Developed in 1988, the common code format was implemented by each of the model code organizations in subsequent editions of their codes. SBCCI, for example, adopted the common code format in its 1994 edition of *SBC*. This common code format, in turn, simplified the development of the *IBC* and should be an aid to users in the transition from one of the regional model codes to the *IBC*.
This publication is intended to give the reader insight into the provisions of the IBC that regulate wood products and it is based on the 2000 edition of the code. Although most of the information provided in this publication pertains to 2000 IBC provisions that address wood and wood construction, some of what is discussed has general application. The reader is encouraged to consult the current edition of the code and to consult the authority having jurisdiction for possible local amendments.

**Comparing the IBC and the SBC**

**ADMINISTRATION (CHAPTER 1)**

As mentioned above, the goal of the ICC is to have a “family” of model international codes available for adoption. At the time of publication of this brochure, there are 11 codes published by the ICC. Of these, 4 have applications to wood products: *International Building Code (IBC)*, *International Residential Code (IRC)* (5), *International Fire Code (IFC)* (6), and *International Performance Code for Buildings and Facilities (IPCBF)* (7). The most significant to wood products are the *IBC* and *IRC*.

The *IBC* is the general building code and coordinating document for the suite of *I-Codes*. The purpose of the *IBC* is to establish minimum requirements for structural strength, means of egress, stability, energy conservation, and safety to life from fire and other hazards attributed to buildings and structures. The provisions of the *IBC* do not, however, apply to one- and two-family dwellings and to certain multiple-family dwellings. The construction of those types of residential structures is addressed in the *IRC*.

ICC specifically establishes a separate document, the *IRC*, for regulation of detached one- and two-family dwellings and multiple single family townhouses, not more than three stories high with separate means of egress and their accessory structures. The format of the *IRC* closely resembles that of the Council of American Building Official’s (CABO) *One- and Two-family Dwelling Code* (8). Under the scope section of the *IBC*, use of the *IRC* is mandatory for residential buildings meeting the *IRC*’s scope. This practice is different from that of *SBC* wherein all residential buildings were addressed, but which permitted compliance with the provisions of the CABO *One and Two Family Dwelling Code* as an alternate through adoption of Appendix C.

The *IBC*, like the *SBC*, makes use of optional appendix chapters, which can play an important role in the regulatory process if specifically adopted. Appendix chapters are not enforceable, unless specifically adopted by the authority having jurisdiction.

**DEFINITIONS (CHAPTER 2)**

Definitions for terms used in the *IBC* were primarily compiled using terms from the three existing model codes. In the *SBC* technical terms are defined in Chapter 2. In the *IBC* all defined words are listed in Chapter 2, but only words of general application are actually defined there. Words that are specific to the technical provisions of a chapter are defined in the corresponding chapter. Words unique to wood construction are defined in Chapter 23, Section 2302.
USE & OCCUPANCY CLASSIFICATIONS (CHAPTER 3)

Although occupancy classifications used in the IBC are similar to those of the SBC, there are a few differences that are highlighted in the following paragraphs.

Assembly. The IBC has five divisions of assembly occupancy while the SBC has only two. The IBC primarily bases its assembly occupancies on the use of the building, e.g., motion picture theaters and restaurants, while assembly occupancies in the SBC are primarily based on occupant load.

In the SBC large assembly (A-1) is defined by having an occupant load of 1,000 or more, or by the presence of a proscenium opening and an occupant load of 700 or more. Everything else, except for uses with an occupant load of 100 or less, is considered small assembly (A-2). There is no distinction in the SBC between actual uses, such as churches and movie theaters, and the IBC does not mention occupant loads or the presence of a proscenium opening, as in the IBC. The four IBC divisions of assembly occupancy in the IBC are defined by the general use of the space or building as follows:

A-1: Uses intended for the production and viewing of performing arts or motion pictures.
A-2: Uses intended for food and/or drink consumption.
A-3: Uses intended for public assembly such as museums, auditoriums, churches, meeting halls, libraries, places of amusement, and other uses not classified elsewhere.
A-4: Uses intended for viewing of indoors sporting events and activities with spectator seating.
A-5: Uses intended for outdoor assembly such as amusement park structures and stadiums.

There is no distinction in the IBC between nightclubs and restaurants -- all occupancies serving food and drink are classified as occupancy group A-2. However, in the SBC nightclubs and restaurants with 100 occupants or less are classified as a Group B, business occupancy, and not an assembly use. The IBC does not provide a similar provision for small restaurants and bars. All are classified as A-2 in the IBC.

Educational. The IBC splits day care operations (care for less than 24 hours) into three separate groups, depending on the age and number of children. Occupancy group E is reserved for children over 2 ½ years of age, with an exception that infant daycare facilities with no more than 100 children where all care rooms have an exterior door and are located on the level of exit discharge could also be classified as E. If the exception is not met, day care for infants is classified as I-4. In the SBC, day care for six or more children of any age is classified as occupancy E.

Mercantile. Mercantile uses in the IBC are similar to those in the SBC with one exception. The IBC limits the quantity of nonflammable solid hazardous material and nonflammable or noncombustible liquid hazardous materials stored or displayed in a single control area. In doing so, the IBC uses the concept of “control area” to regulate spaces within the building enclosed and bounded by exterior building elements and/or fire-resistant interior assemblies. The SBC does not utilize the concept of “control area.” (For further information see the discussion on Chapter 7, Fire Resistance-Rated Construction.)

Mixed Use. The challenging problem of mixed-use buildings is handled slightly differently in the IBC than it is in the SBC. The SBC classifies a building containing two or more occupancies as a mixed occupancy building. Because each occupancy group differs from the others in the amount of combustible contents and other fire hazard characteristics, SBC generally requires fire resistance separation between occupancy groups. However, SBC also allows for a building consisting of multiple occupancies to be classified as a single occupancy provided the most restrictive occupancy requirements are applied throughout the building. The IBC utilizes a similar, but more detailed approach to mixed uses. IBC classifies a mixed occupancy building as containing either “separated uses” or “non-separated uses.”
### Table I
Code Comparison - Mixed Uses and Occupancies

<table>
<thead>
<tr>
<th>Code Provisions</th>
<th>IBC</th>
<th>SBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separated Uses</td>
<td>Allows mixed occupancies if they are separated as per 302.3.3 and the sum of the occupancy ratios does not exceed one.</td>
<td>Allows mixed occupancies if they are separated per Section 704. Allowable height and area of the building cannot exceed that applying to the principle intended use. Also, each portion of the building must conform to all other requirements of the code for the occupancy contained therein.</td>
</tr>
<tr>
<td>Non-separated Uses</td>
<td>Allows uses to be unseparated within a fire area if the fire area does not exceed the allowable height and area for the type of construction, based on the more restrictive occupancy group.</td>
<td>Allows uses to be unseparated provided the entire building conforms to the most restrictive type of construction requirements. Portions of the building used as accessory offices or for customary nonhazardous uses necessary to transacting business are permitted to be non-separated uses as provided in Section 704.1.2.</td>
</tr>
</tbody>
</table>

1. Occupancy ratios is the actual occupancy floor area divided by the tabular area permitted for that occupancy group in specific construction type
2. Fire area is the aggregate floor area enclosed and bounded by exterior walls or fire resistive building elements as defined in *IBC* Section 702.

Table I compare the methods for addressing mixed occupancy buildings.

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### GENERAL BUILDING HEIGHTS & AREAS (CHAPTER 5)

*IBC* provisions regulating allowable building heights and areas are generally based on the least restrictive provision of any of the three model codes. The ICC recognized that each code had rationale for establishment of its values. So, in the absence of fire loss data indicating that an allowable building area in one of the three model codes was problematic, the largest building area permitted by any of the model codes for an occupancy group was generally chosen. With respect to the *SBC* there is a notable exception to this general rule. *SBC* would allow 5-story buildings of Type V 1-hour, unsprinklered construction for Business and Residential use, but the *IBC* limits such construction (*IBC* Type III-B) to only four stories in height. Further, subsequent to the adoption of the 2000 *IBC*, amendments to the *IBC* have somewhat modified the original provisions by including some limits on overall building area and the method for calculation of increased area due to open spaces around the perimeter of the building. (See the discussion on area modifications.)

#### General Height and Area Limitations (Section 503)

Because of the approach taken by the ICC to generally retain the least restrictive building area allowances of the model building codes for any particular occupancy, the *IBC* generally provides larger per-floor areas for low-rise buildings than is allowed in the *SBC*. In some cases *IBC* floor areas represent a substantial increase over that found in the *SBC*. Table II provides maximum...
unmodified height and area limits in the *IBC* (as contained in *IBC* Table 503) for certain use groups constructed of combustible construction (see Chapter 6 - Types of Construction for definitions of combustible construction). Too often, designers see this table as a barrier to using wood construction. However, the code permits very large wood frame buildings if designers apply the permitted modifications to the areas of the *IBC*. Appendix A of this document contains tables comparing the allowable heights and areas of the *SBC* and *IBC*.

In addition to the single-story floor areas being different in some instances as discussed above, provisions for calculating allowable areas of multistory buildings are handled very differently in the two codes. In the *SBC* the user is given the tabular area for single story buildings, the tabular area for multistory buildings, and the maximum building height in stories and feet. In the *SBC*, the maximum area of a building is the product of the tabular floor area times the number of stories. *IBC* calculations are more rigorous. In the *IBC*, a per-floor tabular area is given, as is the maximum building height in stories and in feet, but the maximum aggregate area of all floors in the building is limited to not more than three times the maximum adjusted allowable single-story area (in accordance with Section 503.3).

<table>
<thead>
<tr>
<th>Feature</th>
<th><em>IBC</em></th>
<th><em>SBC</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum open space for increase credit</td>
<td>20 feet</td>
<td>30 feet</td>
</tr>
<tr>
<td>Open space increase credit</td>
<td>Ratio of total perimeter to open perimeter – 75% maximum increase to allowable area</td>
<td>Ratio of total perimeter to open perimeter – 100% maximum increase to allowable area</td>
</tr>
<tr>
<td>Automatic sprinkler system increase credit (NFPA 13 system)</td>
<td>The allowable area increase for use of automatic sprinkler systems must be calculated: 300% increase for 1-story buildings, 200% increase for multi-story buildings</td>
<td>The allowable area of sprinklered buildings is included in Table 500. Table 500 includes: 300% increase for 1-story buildings, 200% increase for multi-story buildings</td>
</tr>
</tbody>
</table>

Modifications of height and area limitations are permitted as is discussed in the following sections of this document. Comparisons of modified allowable building areas based on use groups are presented in Appendix A of this brochure.

**Height Modifications (Section 504)**

Both the *IBC* and *SBC* provide for modifications to allowable building height. The modifications of both codes are somewhat different, but rely to a large degree on the installation of automatic sprinkler systems.

*SBC* Table 500, for example, contains limitations to story height and building height in vertical distance for each occupancy group and type of construction. The limitations are based on whether or not the building is equipped with a National Fire Protection Association (NFPA) NFPA-13 (9) automatic sprinkler system. *SBC* Table 500, therefore, recognizes the safety aspects of an NFPA-13 automatic sprinkler system by providing additional stories for sprinklered buildings. *Table 500 also permits a single story increase of the unsprinklered building height when an NFPA 13 system is used and when unsprinklered building floor areas limitations are observed. The *SBC* does not permit height modifications for the installation of NFPA 13R (10) or NFPA 13D (11) systems.
SBC also provides a modification to the method of measuring building height when certain types of grade-level parking garages are erected below residential occupancies. The number of stories used in determining minimum type of construction for a residential occupancy may be measured from the floor above grade-level parking garage if the parking garage is of Type I or II construction, or open of Type III construction.

IBC height modifications are more complicated and expansive. The IBC, for example, permits tradeoffs, i.e., increased number of stories or story height, for installation of automatic sprinkler systems in buildings equipped with NFPA 13 and, in certain cases, NFPA 13R systems. When IBC Section 903.3.1.1 is referenced, an NFPA 13 system is required for the tradeoff. For tradeoffs using NFPA 13R systems, reference is made to Section 903.3.1.2. No increase is permitted for use of an NFPA 13D system.

One specific tradeoff in the IBC allows one additional story in addition to a 20 foot increase to building height for buildings equipped with an NFPA 13 sprinkler system. For residential buildings, e.g., hotels, multi-family residences, fraternities, dormitories, a building equipped with an NFPA 13R system is permitted to be increased by one-story and 20 feet provided the building does not to exceed four stories or 60 feet in height.

Area Modifications (Section 506)

As is the case with building height, the IBC and SBC provide for modifications to allowable building area. In practice, both codes permit area increases when either an automatic sprinkler system or large open space at the perimeter of the building is provided. The methodology for determining the allowable area increase and the amount of increases are different.

The SBC takes a simple approach by including building area increases associated with the use of automatic sprinkler system in the floor area values of Table 500. SBC Table 500 contains floor area limitations for single-story and multiple-story buildings for each occupancy group and type of construction. The limitations are based on whether or not the building is equipped with an NFPA-13 automatic sprinkler system. SBC Table 500, therefore, recognizes the inherent safety aspects of a NFPA-13 automatic sprinkler system by providing 300% of additional floor area for a single-story building and 200% of additional floor area for a multiple-story building. SBC also permits a general area modification where streets, public spaces or horizontal separations from property lines are 30 feet or larger for 25% of the total perimeter. Special occupancy-based modifications are also provided where open space is generally 60 feet or greater.

The IBC takes a more complicated approach. The tabular areas of IBC Table 503 apply to unsprinklered buildings. The tabular areas of IBC Table 503 are permitted to be increased in accordance with a formula if the building is sprinklered and/or the perimeter provides access for fire suppression ground operations. The allowable area is calculated based on the following equation:

\[ A_a = A_t + \left[ \frac{A_t I_f}{100} \right] + \left[ \frac{A_t I_s}{100} \right] \]

where:
- \( A_a \) = Allowable area per floor (square feet)
- \( A_t \) = Tabular area per floor
- \( I_f \) = Area increase due to frontage exceed 25% of the perimeter (percent)
- \( I_s \) = Area increase due to sprinkler protection
The frontage increase ($I_f$) allows for the tabular areas to be increased when the width of the open space equals or exceeds 20 feet for at least 25 percent of the total perimeter (as compared to 30 feet in the SBC). $I_f$ is unique to each building site and is calculated using the following equation:

$$I_f = 100 \left[ \frac{F}{P} - 0.25 \right] \frac{w}{30}$$

where:
- $w$ = Minimum fire separation distance
- $F$ = Building perimeter which fronts on a public way or open space having 20 ft. minimum open width.
- $P$ = Perimeter of entire building

Where the provisions of the IBC require that a building be equipped throughout with an automatic sprinkler system, sprinklers must be installed throughout in accordance with NFPA 13, NFPA 13R, or NFPA 13D as appropriate to the use of the building. However, the area increase is not applicable unless a full NFPA 13 system is installed. Similarly, SBC doesn’t permit an area modification for the installation of NFPA 13R or NFPA 13D systems.

**Unlimited Area Buildings (Section 507)**

Unlimited area building provisions for non-combustible buildings are similar in the IBC and SBC. However, the IBC greatly expands the unlimited area building provisions for construction types that allow combustible materials. The IBC, for example, permits unlimited area single- and two-story buildings of use groups B, F, M and S of any construction type, including traditional wood-frame construction (IBC Type V), when the building is equipped with an automatic sprinkler system and has required open space of 60 feet around the entire perimeter. Although the SBC permits unlimited area single-story buildings of the same use groups and similar construction types, it does not provide for two-story unlimited area buildings regardless of occupancy or construction type. Some of the other IBC provisions for unlimited area buildings are as follow:

**Unsprinklered Uses**

One-story buildings of low hazard storage (S-2) or factory/industrial low hazard (F-2) occupancy are permitted to be of unlimited area regardless of construction type if the building is surrounded by a minimum of 60 feet of open space. There is no requirement that the construction be fire-rated construction. The SBC requires approval of the building official for omission of the sprinkler system.

**Sprinklered, One-story Uses**

The area of a one-story Group A-4 (assembly), B (business), F (factory/industrial), M (mercantile) or S (storage) buildings are permitted to be of unlimited area if the building is provided with an automatic sprinkler system and if the building is provided with 60 feet of open space surrounding the entire perimeter of the building.

**Sprinklered, Two-story Uses**
A two-story building of use group B (business), F (factory), M (mercantile) or S (storage) is permitted to be of unlimited area if the building is built with an automatic sprinkler system and if the building is surrounded on all sides with not less than 60 feet of open space.

<table>
<thead>
<tr>
<th>Feature</th>
<th>IBC</th>
<th>SBC</th>
</tr>
</thead>
</table>
| **Unsprinklered**  
Uses one-story | F-2, S-2, regardless of type of construction               | Group A used for sports (without spectator seating) of Type III, IV and V construction (with 30 ft. horizontal separation on all sides);  
Group B, F, M or S, regardless of type of construction, where the use of water would be ineffective or present a hazard; and  
Group F and S, regardless of type of construction used for the processing or storage of noncombustible materials. |
| **Sprinklered**  
Uses one-story | Group A-4, B, F, M, S regardless of construction type | Groups B, F, M, or S regardless of construction  
Group E of Type III, IV or V construction type when subdivided with 1-hour smokestop partitions.  
Group A (without proscenium opening) of Type V 1-hr., IV or III construction. |
| Sprinklered  
Uses two-stories | B, F, M, S regardless of construction type | Not permitted |
| Required Open Space      | 60 feet                                                   | 60 feet, (30 feet for Group A used for sports without spectator seating) |
| Reduced Open Space       | Permitted under certain conditions                        | Permitted under certain conditions                        |

The *IBC* provides for many new opportunities for unlimited area buildings, particularly those of combustible construction. Table III compares unlimited building provisions of the *IBC* and *SBC*.

**Special Provisions (Section 508)**

Both *IBC* and *SBC* have special provisions for parking structures below residential occupancies. The special provisions of the *IBC* apply to parking structures and mixed use structures containing parking (S-2) and multi-family dwelling units (R-2), A, B, and M occupancies.

*SBC* allows the number of stories for Group R occupancy to be measured from the floor above an open
or enclosed parking area of Type I or II construction or above an open parking structure of Type III construction (Section 503.2.2). SBC also allows greater heights and areas than shown in Table 500 for open parking garages of noncombustible construction in buildings of mixed types of construction.

**TYPES OF CONSTRUCTION (CHAPTER 6)**

Many of the requirements related to construction type will be familiar to SBC users. However, there are significant differences in terminology used in the IBC from that used in the SBC. In the IBC there are five types of construction as compared to six in the SBC. The difference lies in the number of noncombustible designations – two for the IBC versus three for the SBC. Most definitions of construction types in the two codes are similar although the specific numerical name designations and order of numbering are different. Table IV compares the construction type designations contained in the two codes.

<table>
<thead>
<tr>
<th>General Description</th>
<th>IBC Designation</th>
<th>SBC Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noncombustible</td>
<td>Type I (A &amp; B)</td>
<td>Type I</td>
</tr>
<tr>
<td></td>
<td>Type II (A)</td>
<td>Type II</td>
</tr>
<tr>
<td></td>
<td>Type II (B)</td>
<td>Type IV 1-hr Protected</td>
</tr>
<tr>
<td>Mixed noncombustible and combustible</td>
<td>Type III (A)</td>
<td>Type V 1-hr Protected</td>
</tr>
<tr>
<td></td>
<td>Type III (B)</td>
<td>Type V Unprotected</td>
</tr>
<tr>
<td>Combustible – heavy timber and traditional wood frame</td>
<td>Type IV (Heavy Timber)</td>
<td>Type III (Heavy Timber)</td>
</tr>
<tr>
<td></td>
<td>Type V (A)</td>
<td>Type VI 1-hr Protected</td>
</tr>
<tr>
<td></td>
<td>Type V (B)</td>
<td>Type VI Unprotected</td>
</tr>
</tbody>
</table>

A significant difference occurs between the two codes where fire-retardant treated wood is permitted to be used. Table V summarizes these applications. While the SBC permits use of fire-retardant wood in some applications in noncombustible types of construction, the IBC has broadened those applications.

As mentioned above, designers often believe that using a combustible type of construction brings with it restrictions in building size that may not meet building needs. While wood frame construction (IBC Type V) is the most limited in building area, many of the restriction can be offset by adding sprinklers or providing open space around the building. Further, using heavy timber construction (IBC Type IV – SBC Type III) can provide floor areas comparable to noncombustible construction and IBC Type III (SBC Type V) construction permits the use of a significant amount of wood, particularly if the building is located away from the property line.

In Section 602.3 the IBC defines Type III Construction as being “that type in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by the code.” The section goes on to say that fire-retardant treated wood is permitted in exterior wall assemblies in lieu of noncombustible materials when the rating of the wall is required to be 2-hours or less. Table VIII provides a snapshot of situations in which a Type III building can be wholly of wood.
### Table V
Comparison of Allowable Use of Fire Retardant Treated Wood between IBC and SBC

<table>
<thead>
<tr>
<th>IBC Construction Type</th>
<th>Building Assembly</th>
<th>IBC</th>
<th>SBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I and II Construction</td>
<td>Roof structures</td>
<td>Permitted in buildings not over two-stories (T601, note c3)</td>
<td>Permitted in buildings not over two-stories (T600, note e).</td>
</tr>
<tr>
<td></td>
<td>Exterior walls</td>
<td>Permitted when the wall is non-load bearing and a fire rating is not required (603.1.1.2)</td>
<td>Permitted in noncombustible non-load bearing walls over 30 ft from property line (T600, note k).</td>
</tr>
<tr>
<td></td>
<td>Interior walls</td>
<td>Permitted in non-load bearing partitions where the fire rating is 2 hours or less (603.1.1.1)</td>
<td>Permitted in non-load bearing partitions in Types I, II, &amp; IV (609).</td>
</tr>
<tr>
<td>Type III and IV Construction</td>
<td>Exterior walls</td>
<td>Permitted in exterior walls when the required rating is 2-hours or less</td>
<td>Permitted in Type IV non-load bearing walls over 30 ft from property line (T600, note k).</td>
</tr>
<tr>
<td>Type V Construction</td>
<td>All Assemblies</td>
<td>Requirements for IBC Type V construction and SBC Type VI are identical. Use of FRTW is unrestricted</td>
<td></td>
</tr>
</tbody>
</table>

construction. It compares the unmodified allowable areas and heights of Type IIIB (unprotected) with those of Type IIB (noncombustible unprotected).

The area and height modifications discussed previously for sprinklers and open space are applicable to these values.

### Table VI
Comparison of IBC Type IIB and Type IIIB Construction Allowable Areas and Heights

<table>
<thead>
<tr>
<th>IBC Occupancy Group</th>
<th>Table 503 Base Allowable Area (sq ft)</th>
<th>Table 503 Base Allowable Height (stories/feet)</th>
<th>Horizontal Distance Required from Property Line to Allow 2-hr Rating or Less (T601 &amp; T602)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type IIB</td>
<td>Type IIIB</td>
<td>Type IIB</td>
</tr>
<tr>
<td>A-3 church</td>
<td>9500</td>
<td>9500</td>
<td>2/55</td>
</tr>
<tr>
<td>B</td>
<td>23000</td>
<td>19000</td>
<td>4/55</td>
</tr>
<tr>
<td>E</td>
<td>14500</td>
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<td>2/55</td>
</tr>
<tr>
<td>M</td>
<td>12500</td>
<td>12500</td>
<td>4/55</td>
</tr>
<tr>
<td>R-1 hotel</td>
<td>16000</td>
<td>16000</td>
<td>4/55</td>
</tr>
</tbody>
</table>
FIRE-RESISTANCE-RATED CONSTRUCTION (CHAPTER 7)

This chapter differs from the SBC in a number of significant ways. The general terminology for fire-resistant assemblies used in the IBC is very different from what is found in the SBC. The IBC often requires that a fire-rated assembly perform a particular function and, in those situations, the assemblies are referred to by particular names. Some of these terms are used in the SBC; others are new (see Table VII).

An important difference between the two codes involves the way in which fire walls are addressed. Similar to the SBC, fire walls in the IBC are primarily used to separate buildings – that is, each part of a building or structure included within fire walls are considered separate buildings with the exception

<table>
<thead>
<tr>
<th>Feature</th>
<th>IBC</th>
<th>SBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Partition</td>
<td>A rated vertical assembly with specific continuity and opening protection provisions, required for separation of dwellings and corridors, among other uses</td>
<td>Not specifically used although fire resistant partitions in the SBC are addressed with respect to fire separation requirements of 704.2.</td>
</tr>
<tr>
<td>Fire Barrier</td>
<td>A rated horizontal or vertical assembly with specific continuity and opening protection provisions, required for separation of mixed occupancies, shaft protection, exit stair separation, and elevator lobbies among other uses</td>
<td>Not specifically used. In the IBC a fire barrier separates occupancies. The SBC also establishes occupancy separation requirements, but does not name them “fire barriers.”</td>
</tr>
<tr>
<td>Party Wall</td>
<td>Any wall located on a property line between adjacent buildings which is used or adapted for joint service between the two buildings. Party walls create separate buildings. Party walls are constructed as fire walls without openings.</td>
<td>Essentially the same. In the SBC a party wall is a fire wall on an interior lot line, used or adapted for joint service between buildings.</td>
</tr>
<tr>
<td>Fire Wall</td>
<td>A rated wall extending from the foundation to the roof, of combustible or non-combustible construction, able to withstand collapse of construction on either side. Used to separate buildings for area limitations, fire walls are required to be continuous and extend beyond the exterior walls of the building. The required rating depends on the construction type and the occupancy groups involved.</td>
<td>Similar, but different. Both codes use fire walls to separate buildings. The IBC, however, relates fire wall ratings to occupancy groups. In the SBC the fire resistance rating is independent of occupancy group. The fire resistance rating of a fire wall in the SBC is 4-hours. In the IBC, fire wall ratings vary. Further, in the SBC fire walls are required to be of noncombustible construction.</td>
</tr>
</tbody>
</table>
that fire walls within a building permitted to be of unlimited area are not considered as establishing separating buildings. However, in the IBC the rating of the fire wall is occupancy group dependant.

**IBC** Table 705.4 permits most occupancy groups to employ 3-hour fire walls. Four-hour walls, which are required in all but one instance in the **SBC** (townhouses), are required only in buildings of Group H-1 and H-2 occupancy groups. In some situations fire walls in the **IBC** can be rated as low as 2-hours. Additionally, **IBC** Section 705.3, which requires that fire walls be of noncombustible materials, contains an exception which permits fire walls in Type V Construction (wood-frame) to be of combustible materials. The structural performance requirements of the fire wall are the same whether the wall is combustible or non-combustible. The designer must demonstrate the structural integrity of the wall, given collapse of the building on either side.

A helpful difference between the two codes is the inclusion of prescriptive tables for fire rated assemblies in Table 719.1 of the **IBC**. This information is useful to the building designer, reducing the need to look for this information in other resources. Specifically, **IBC** Section 720.6.2 incorporates provisions of the “component additive method” and Section 720.6.3 specifies procedures for use of the design methodology for exposed heavy timber members (large-section wood members).

**STRUCTURAL DESIGN (CHAPTER 16)**

Chapter 16 of both codes prescribe minimum loads that must be used in the design of buildings and structures to insure structural safety. The purpose of Chapter 16 is to insure that every building and structure has sufficient strength to support loads and forces it will likely encounter during its life without any structural elements being unduly stressed. Chapter 16 covers general requirements, loads, load combinations, serviceability and deflections of structural members.

Except for wind and seismic load values and design procedures, the provisions of the **IBC** and **SBC** are very similar. As in **SBC**, **IBC** load values primarily come from the American Society of Civil Engineers (ASCE) standard *Minimum Design Loads for Buildings and Structures* (ASCE 7) (12). Whereas, **SBC** references ASCE 7-95 (the 1995 edition of the standard), **IBC** is primarily based on ASCE 7-98. Seismic load values in **IBC** and **SBC** derive from ASCE 7-95 and the National Earthquake Hazard Reduction Program’s (NEHRP) *Recommended Provisions for the Development of Seismic Regulations for New Buildings* (13). **IBC** seismic values are based on the 1998 version of the NEHRP standard, while **SBC** is based on the 1991 NEHRP standard.

The main difference between **SBC**’s use of ASCE 7-95 and **IBC**’s use of ASCE 7-98 involves wind loads. **IBC** wind provisions are 3-second gust wind speeds while **SBC** wind provisions are based on fastest-mile wind speeds. The wind speed map in Figure 1609 of the **IBC** presents 3-second gust wind speed contours, which are significantly different from the fastest-mile wind speed contours of the **SBC**. To assist the user of the code in transitioning from 3-second gust wind speeds and fastest mile wind speeds, the **IBC** provides a convenient table for converting the wind speed of the two methodologies (Table 1609.3.1). This conversion table enables continued use of industry design standards such as AF&PA’s *Wood Frame Construction Manual: SBC High Wind Edition* (WFCM) (14), which is referenced as an alternate methodology for design of one- and two-family buildings in both codes. The **IBC** provides for a simplified procedure for determining wind loads on low-rise buildings (buildings with a mean roof height not exceeding 60 ft) similar to that of the **SBC**. The special low-rise provisions in the **IBC** were developed from ASCE 7-98 and the provisions of **SBC**
IBC seismic design issues are much more extensive than those of SBC. Much of the seismic loading values of the IBC were derived from the UBC and NEHRP. Important to buildings located in high wind areas is the requirement in 1609.1.5 that lateral-force-resisting systems need to meet seismic detailing requirements and limitations even when wind load effects are greater than seismic load effects. This requirement is intended to ensure that fastening of wood members will adequately meet the multidimensional forces of earthquakes in addition to the monotonic forces of a wind event. The IBC, like SBC, specifically exempts seismic-force-resisting system of wood frame buildings that conform to the seismic provisions of conventional light-frame construction provisions of Chapter 23 from analysis of seismic forces.

Finally, it should be noted that the IBC requires structures located in flood hazard areas to be designed in accordance with ASCE 24-98 (Flood Resistance Design and Construction Standard) (15), a standard which is not referenced in the SBC. SBC referenced its own Standard for Floodplain Management.

WOOD (CHAPTER 23)

Chapter 23 of both the IBC and SBC govern materials, design, construction, and quality of wood members and their fasteners. Chapter 23 contains a number of specifications intended to provide guidance to nonprofessional as well as professional users of the code. Chapter 23 of the IBC requires that the design of wood structural elements or systems be based on allowable stress design (ASD), load and resistance factor design (LRFD), or conventional light-frame construction provisions in Section 2308. SBC Chapter 23 does not identify the design method although the provisions are based on ASD.

The IBC contains the same material as the SBC with some reorganization while adding detail regarding seismic and wind loading, shear walls, and diaphragms. For example, the IBC institutes minimum requirements for connecting roof framing to walls and provisions for roof framing connections outside high wind areas. As a convenience to the user, the IBC includes joist and rafter span tables and a number of illustrations that were referenced in the SBC. The IBC deletes the termite infestation map and provisions for under slab soil treatment.

Otherwise, many of the IBC’s prescriptive provisions for conventional construction of light-frame wood structures are similar to those found in the SBC. The primary differences between the IBC provisions and those in the SBC primarily involve seismic issues, with the biggest being the way walls are braced for lateral loading.

Exterior walls are required to be braced for lateral loading. The traditional exterior wall was sheathed with wood boards applied diagonally. This system provided adequate bracing for lateral loading and has been used as the basis for comparing other methods and systems. The bracing requirements of the SBC are quite simple and assume a regular rectangular building. The SBC generally requires bracing at each corner of a building and at every 25 ft of exterior wall. The bracing requirements of the IBC are much more complex and reflect the seismic-sensitive provisions of the UBC. The IBC sets out six conditions defining irregular structures and institutes wall bracing requirements for these buildings. The IBC braced wall provisions include cantilevers and conditions.
where load bearing walls do not align vertically in two or more story buildings. Otherwise, for
regular rectangular buildings, walls bracing requirements are similar.

It should be noted that the conventional construction provisions in the *IBC* do not apply to one- and
two-family dwellings. Conventional construction requirements for one-, two-family dwellings and
multiple single-family townhouse units are contained in the *International Residential Code (IRC)*.
Therefore, the scope of the *IBC* is significantly different from that of the *SBC* with respect to
residential structures. *SBC* addresses the requirements of all residential buildings and structures
including one- and two-family dwellings, but it also allows the optional use of the Council of
American Building Officials (CABO) *One and Two Family Dwelling Code* for Group R3
occupancies. The *IBC*, on the other hand, makes mandatory the use of a separate document, the *IRC*,
for one- and two-family dwellings, and multiple single-family dwellings meeting the definition of
townhouse.

*SBC* prescriptive wood construction provisions are generally applicable to light wood-framed
residential buildings located in non coastal areas – that is, in areas where wind speeds do not exceed
80 mph. *SBC* conventional construction provisions are not limited to certain seismic zones. *IBC*
conventional construction provisions are more restrictive in application. Although the *IBC* does not
specifically limit conventional construction to residential buildings, its use is limited by Section
2308.2 to buildings with floor loads not exceeding 40 psf, (i.e., residential buildings). The
conventional prescriptive provisions in the wood chapter of the *IBC* are further limited by wind and
seismic thresholds. Structures that do not fall within the general limitations of 2308 must comply
with the design requirements of Chapter 16.

The conventional construction provisions in the *IRC* came primarily from the CABO *One-and Two-
Family Dwelling Code* (later the *International One-and Two-Family Dwelling Code*). Those
provisions have been updated to some extent. The differences between the *IRC* provisions for wood
construction and those in the *SBC* are minor. There are precalculated joist and rafter tables that did
not exist in the *SBC*. There are also a number of illustrations that may be familiar to users of the
CABO One- and Two-Family Dwelling Code, but which may be new to *SBC* users.

AF&PA’s *Wood Frame Construction Manual: SBC High Wind Edition (WFCM)* (14) is referenced
in both the *IBC* and *IRC* as an alternate design standard for construction of light-frame wood
buildings in high wind areas. It is also a convenient design manual for buildings that are not subject
to high winds. The WFCM provides prescriptive construction and engineering guidelines for light-
frame wood buildings. The easy-to-use WFCM often negates the need for professional design
services for one and two-family dwellings.
REFERENCES

## Comparison of IBC-SBC Allowable Building Area Based on Percentage of Open Perimeter

**Large Restaurant**

**IBC Use Group A-2 vs SBC Group A-2 Assembly Small**

<table>
<thead>
<tr>
<th>SBC Type of Construction</th>
<th>V 1-Hr.</th>
<th>V Unprotected</th>
<th>III (HT)</th>
<th>VI 1-Hr.</th>
<th>VI Unprotected</th>
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</thead>
<tbody>
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<td>12,000</td>
<td>12,000</td>
<td>7,500</td>
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<td>24,000</td>
<td>22,500</td>
<td>15,000</td>
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<td>2</td>
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<td>1</td>
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<td><strong>IBC Type of Construction</strong></td>
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<tr>
<td>IBC Tabular (Unsprinklered) Areas</td>
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<td>3</td>
<td>2</td>
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<td>2</td>
<td>1</td>
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</table>

### Unsprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>IBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>24,000</td>
<td>42,000</td>
</tr>
<tr>
<td></td>
<td>24,000</td>
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<td>40,250</td>
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<tr>
<td></td>
<td>10,000</td>
<td>10,500</td>
</tr>
</tbody>
</table>

### Sprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>IBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>48,000</td>
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<td></td>
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</table>

1 The SBC requires a minimum fire separation distance of 30 feet for open space increase; the IBC requires a minimum of 20 feet.
Comparison of IBC-SBC Allowable Building Area Based on Percentage of Open Perimeter
IBC Use Group A-2 vs SBC Group B - less than 100 occupants

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<tr>
<th>SBC Type of Construction</th>
<th>V 1-Hr. Unprotected</th>
<th>V (HT)</th>
<th>III (HT)</th>
<th>VI 1-Hr.</th>
<th>VI Unprotected</th>
</tr>
</thead>
<tbody>
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<td>SBC Multistory Unsprinkled Floor Areas</td>
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<td>14,000</td>
<td>25,500</td>
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<td>9,000</td>
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<tr>
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<td>2</td>
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<table>
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<td>IBC Maximum Stories for Increase</td>
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<thead>
<tr>
<th>Percent Open Perimeter</th>
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<th>100%</th>
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<td>Unsprinklered Building Aggregate Floor Area (square feet)</td>
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<tr>
<td>SBC</td>
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<table>
<thead>
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*The SBC requires a minimum fire separation distance of 30 feet for open space increase; the IBC requires a minimum of 20 feet
## Comparison of IBC-SBC Allowable Building Area Based on Percentage of Open Perimeter

<table>
<thead>
<tr>
<th>IBC Use Group A-3 vs SBC Group A-1</th>
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<tbody>
<tr>
<td>SBC Type of Construction</td>
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<tr>
<td>III (HT)</td>
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<tr>
<td>VI 1-Hr. Unprotected</td>
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<table>
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<th>IBC</th>
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<td>42,000</td>
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<tr>
<td>8,000 III (HT)</td>
<td>8,000</td>
<td>19,000</td>
</tr>
<tr>
<td>12,000 VI 1-Hr. Unprotected</td>
<td>12,000</td>
<td>45,000</td>
</tr>
<tr>
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<th>IBC</th>
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<tr>
<td>1 IBC Allowable Stories</td>
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</tr>
<tr>
<td>0 IBC Maximum Stories for Increase</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Unsprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>IBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>12,000</td>
<td>42,000</td>
</tr>
<tr>
<td>16,000</td>
<td>19,000</td>
<td>45,000</td>
</tr>
<tr>
<td>20,000</td>
<td>28,000</td>
<td>67,500</td>
</tr>
<tr>
<td>24,000</td>
<td>33,250</td>
<td>78,750</td>
</tr>
</tbody>
</table>

### Sprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>IBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>36,000</td>
<td>126,000</td>
</tr>
<tr>
<td>48,000</td>
<td>57,000</td>
<td>135,000</td>
</tr>
<tr>
<td>60,000</td>
<td>61,750</td>
<td>146,250</td>
</tr>
<tr>
<td>72,000</td>
<td>66,500</td>
<td>168,750</td>
</tr>
</tbody>
</table>

*The SBC requires a minimum fire separation distance of 30 feet for open space increase; the IBC requires a minimum of 20 feet*
## Comparison of IBC-SBC Allowable Building Area Based on Percentage of Open Perimeter

**IBC Use Group A-3 vs SBC Group A-4**

<table>
<thead>
<tr>
<th>SBC Type of Construction</th>
<th>V 1-Hr.</th>
<th>V Unprotected</th>
<th>III (HT)</th>
<th>VI 1-Hr.</th>
<th>VI Unprotected</th>
</tr>
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<tbody>
<tr>
<td>SBC Multistory Unsprinklered Floor Areas</td>
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<td>8,000</td>
<td>12,000</td>
<td>7,500</td>
<td>5,000</td>
</tr>
<tr>
<td>SBC Multistory Sprinklered Floor Areas</td>
<td>24,000</td>
<td>16,000</td>
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<td>15,000</td>
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<tr>
<td>SBC Allowable Stories</td>
<td>2</td>
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<table>
<thead>
<tr>
<th>IBC Type of Construction</th>
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<th>3B</th>
<th>4 (HT)</th>
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<th>5B</th>
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</thead>
<tbody>
<tr>
<td>IBC Tabular (Unsprinklered) Areas</td>
<td>14,000</td>
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<td>6,000</td>
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<tr>
<td>IBC Allowable Stories</td>
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<tr>
<td>IBC Maximum Stories for Increase</td>
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### Unsprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>IBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>24,000</td>
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<tr>
<td></td>
<td>16,000</td>
<td>19,000</td>
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<td>6,000</td>
</tr>
<tr>
<td>50%</td>
<td>32,000</td>
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<tr>
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<tr>
<td></td>
<td>6,667</td>
<td>7,500</td>
</tr>
<tr>
<td>75%</td>
<td>40,000</td>
<td>63,000</td>
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<tr>
<td></td>
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<td>28,500</td>
</tr>
<tr>
<td></td>
<td>40,000</td>
<td>67,500</td>
</tr>
<tr>
<td></td>
<td>12,500</td>
<td>34,500</td>
</tr>
<tr>
<td></td>
<td>8,333</td>
<td>9,000</td>
</tr>
<tr>
<td>100%</td>
<td>48,000</td>
<td>73,500</td>
</tr>
<tr>
<td></td>
<td>32,000</td>
<td>33,250</td>
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<td>40,250</td>
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<td>10,000</td>
<td>10,500</td>
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### Sprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>IBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
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<td>57,000</td>
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<tr>
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<td>30,000</td>
<td>28,500</td>
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</table>

*The SBC requires a minimum fire separation distance of 30 feet for open space increase; the IBC requires a minimum of 20 feet*
## Comparison of IBC-SBC Allowable Building Area Based on Percentage of Open Perimeter

**Use Group B**

<table>
<thead>
<tr>
<th>SBC Type of Construction</th>
<th>V 1-Hr. V Unprotected</th>
<th>III (HT)</th>
<th>VI 1-Hr. VI Unprotected</th>
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</thead>
<tbody>
<tr>
<td>SBC Multistory Unsprinkled Floor Areas</td>
<td>21,000</td>
<td>14,000</td>
<td>25,500</td>
</tr>
<tr>
<td>SBC Multistory Sprinkled Floor Areas</td>
<td>42,000</td>
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<td>51,000</td>
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<tr>
<td>SBC Allowable Stories</td>
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<td>2</td>
<td>5</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>IBC Type of Construction</th>
<th>3A</th>
<th>3B</th>
<th>4 (HT)</th>
<th>5A</th>
<th>5B</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBC Tabular (Unsprinkled) Areas</td>
<td>28,500</td>
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<tr>
<td>IBC Allowable Stories</td>
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<td>5</td>
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**Unsprinkled Building Aggregate Floor Area (square feet)**

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>IBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>105,000</td>
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<tr>
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<td>54,000</td>
</tr>
<tr>
<td></td>
<td>18,000</td>
<td>18,000</td>
</tr>
<tr>
<td>50%</td>
<td>140,000</td>
<td>106,875</td>
</tr>
<tr>
<td></td>
<td>37,333</td>
<td>71,250</td>
</tr>
<tr>
<td></td>
<td>170,000</td>
<td>135,000</td>
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<td>67,500</td>
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<td></td>
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<td>22,500</td>
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<tr>
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<td>85,500</td>
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<tr>
<td></td>
<td>212,500</td>
<td>162,000</td>
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<td>81,000</td>
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<tr>
<td></td>
<td>30,000</td>
<td>27,000</td>
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<tr>
<td>100%</td>
<td>210,000</td>
<td>149,625</td>
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<tr>
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<td>56,000</td>
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<tr>
<td></td>
<td>255,000</td>
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<tr>
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<td>36,000</td>
<td>31,500</td>
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**Sprinklered Building Aggregate Floor Area (square feet)**

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>IBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>210,000</td>
<td>256,500</td>
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<tr>
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<td>140,000</td>
<td>171,000</td>
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<tr>
<td></td>
<td>255,000</td>
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<td>175,500</td>
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<td>58,500</td>
</tr>
<tr>
<td>75%</td>
<td>350,000</td>
<td>299,250</td>
</tr>
<tr>
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<td>233,333</td>
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<tr>
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<tr>
<td></td>
<td>72,000</td>
<td>67,500</td>
</tr>
</tbody>
</table>

1 SBC requires a minimum fire separation distance of 30 feet for open space increase. IBC requires a minimum of 20 feet.
## Comparison of IBC-SBC Allowable Building Area Based on Percentage of Open Perimeter

**Use Group E**

### SBC Type of Construction

<table>
<thead>
<tr>
<th></th>
<th>V 1-Hr.</th>
<th>V Unprotected</th>
<th>III (HT)</th>
<th>VI 1-Hr.</th>
<th>VI Unprotected</th>
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<tbody>
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<td>24,000</td>
<td>24,000</td>
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<td>SBC Allowable Stories</td>
<td>2</td>
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<td>2</td>
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### IBC Type of Construction

<table>
<thead>
<tr>
<th></th>
<th>3A</th>
<th>3B</th>
<th>4 (HT)</th>
<th>5A</th>
<th>5B</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBC Tabular (Unsprinklered) Areas</td>
<td>23,500</td>
<td>14,500</td>
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<td>9,500</td>
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<tr>
<td>IBC Maximum Stories for Increase</td>
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### Unsprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>IBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>36,000</td>
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<tr>
<td></td>
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<tr>
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<td>16,000</td>
<td>16,625</td>
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</tbody>
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### Sprinklered Building Aggregate Floor Area (square feet)

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<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>IBC</th>
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<tbody>
<tr>
<td>25%</td>
<td>72,000</td>
<td>211,500</td>
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<tr>
<td></td>
<td>36,000</td>
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<td>38,000</td>
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<tr>
<td>50%</td>
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<td>229,125</td>
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<tr>
<td></td>
<td>48,000</td>
<td>94,250</td>
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<tr>
<td></td>
<td>48,000</td>
<td>45,125</td>
</tr>
</tbody>
</table>

*The SBC requires a minimum fire separation distance of 30 feet for open space increase; the IBC requires a minimum of 20 feet.*
Comparison of IBC-SBC Allowable Building Area Based on Percentage of Open Perimeter

IBC Use Group 1-2 - 24-hour care to more than 5 children, 1 1/2 years of age or less

vs

SBC Group I Unrestrained

<table>
<thead>
<tr>
<th>SBC Type of Construction</th>
<th>V 1-Hr.</th>
<th>V Unprotected</th>
<th>III (HT)</th>
<th>VI 1-Hr.</th>
<th>VI Unprotected</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC Multistory Unsprinklered Floor Areas</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SBC Sprinklered Floor Areas</td>
<td>31,500</td>
<td>0</td>
<td>24,000</td>
<td>22,500</td>
<td>0</td>
</tr>
<tr>
<td>SBC Allowable Stories</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IBC Type of Construction</th>
<th>3A</th>
<th>3B</th>
<th>4 (HT)</th>
<th>5A</th>
<th>5B</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBC Tabular (Unsprinklered) Areas</td>
<td>12,000</td>
<td>0</td>
<td>12,000</td>
<td>9,500</td>
<td>0</td>
</tr>
<tr>
<td>IBC Allowable Stories</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>IBC Maximum Stories for Increase</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Unsprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>-</th>
<th>-</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>IBC</td>
<td>12,000</td>
<td>-</td>
<td>12,000</td>
<td>9,500</td>
</tr>
<tr>
<td>50%</td>
<td>IBC</td>
<td>15,000</td>
<td>-</td>
<td>15,000</td>
<td>11,875</td>
</tr>
<tr>
<td>75%</td>
<td>IBC</td>
<td>18,000</td>
<td>-</td>
<td>18,000</td>
<td>14,250</td>
</tr>
<tr>
<td>100%</td>
<td>IBC</td>
<td>21,000</td>
<td>-</td>
<td>21,000</td>
<td>16,625</td>
</tr>
</tbody>
</table>

Sprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>-</th>
<th>-</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>IBC</td>
<td>48,000</td>
<td>-</td>
<td>48,000</td>
<td>38,000</td>
</tr>
<tr>
<td>50%</td>
<td>IBC</td>
<td>51,000</td>
<td>-</td>
<td>51,000</td>
<td>40,375</td>
</tr>
<tr>
<td>75%</td>
<td>IBC</td>
<td>54,000</td>
<td>-</td>
<td>54,000</td>
<td>42,750</td>
</tr>
<tr>
<td>100%</td>
<td>IBC</td>
<td>57,000</td>
<td>-</td>
<td>57,000</td>
<td>45,125</td>
</tr>
</tbody>
</table>

*The SBC requires a minimum fire separation distance of 30 feet for open space increase; the IBC requires a minimum of 20 feet
Comparison of IBC-SBC Allowable Building Area Based on Percentage of Open Perimeter

Use Group M

<table>
<thead>
<tr>
<th>SBC Type of Construction</th>
<th>V 1-Hr.</th>
<th>V Unprotected</th>
<th>III (HT)</th>
<th>VI 1-Hr.</th>
<th>VI Unprotected</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC Multistory Unsprinklered Floor Areas</td>
<td>13,500</td>
<td>9,000</td>
<td>13,500</td>
<td>9,000</td>
<td>6,000</td>
</tr>
<tr>
<td>SBC Multistory Sprinklered Floor Areas</td>
<td>27,000</td>
<td>18,000</td>
<td>27,000</td>
<td>18,000</td>
<td>12,000</td>
</tr>
<tr>
<td>SBC Allowable Stories</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IBC Type of Construction</th>
<th>3A</th>
<th>3B</th>
<th>4 (HT)</th>
<th>5A</th>
<th>5B</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBC Tabular (Unsprinklered) Areas</td>
<td>18,500</td>
<td>12,500</td>
<td>20,500</td>
<td>1,400</td>
<td>9,000</td>
</tr>
<tr>
<td>IBC Allowable Stories</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>IBC Maximum Stories for Increase</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
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Unsprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>67,500</th>
<th>18,000</th>
<th>67,500</th>
<th>18,000</th>
<th>12,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IBC</td>
<td>55,500</td>
<td>37,500</td>
<td>61,500</td>
<td>4,200</td>
<td>9,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>90,000</th>
<th>24,000</th>
<th>90,000</th>
<th>24,000</th>
<th>16,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IBC</td>
<td>69,375</td>
<td>46,875</td>
<td>76,875</td>
<td>5,250</td>
<td>11,250</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>112,500</th>
<th>30,000</th>
<th>112,500</th>
<th>30,000</th>
<th>20,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IBC</td>
<td>83,250</td>
<td>56,250</td>
<td>92,250</td>
<td>6,300</td>
<td>13,500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>135,000</th>
<th>36,000</th>
<th>135,000</th>
<th>36,000</th>
<th>24,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IBC</td>
<td>97,125</td>
<td>65,625</td>
<td>107,625</td>
<td>7,350</td>
<td>15,750</td>
</tr>
</tbody>
</table>

Sprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>135,000</th>
<th>90,000</th>
<th>135,000</th>
<th>36,000</th>
<th>24,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IBC</td>
<td>166,500</td>
<td>112,500</td>
<td>184,500</td>
<td>12,600</td>
<td>36,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>180,000</th>
<th>120,000</th>
<th>180,000</th>
<th>48,000</th>
<th>32,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IBC</td>
<td>180,375</td>
<td>121,875</td>
<td>199,875</td>
<td>13,650</td>
<td>38,250</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>225,000</th>
<th>150,000</th>
<th>225,000</th>
<th>60,000</th>
<th>40,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IBC</td>
<td>194,250</td>
<td>131,250</td>
<td>215,250</td>
<td>14,700</td>
<td>40,500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>270,000</th>
<th>180,000</th>
<th>270,000</th>
<th>72,000</th>
<th>48,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IBC</td>
<td>208,125</td>
<td>140,625</td>
<td>230,625</td>
<td>15,750</td>
<td>42,750</td>
</tr>
</tbody>
</table>

1 The SBC requires a minimum fire separation distance of 30 feet for open space increase; the IBC requires a minimum of 20 feet.
Comparison of IBC-SBC Allowable Building Area Based on Percentage of Open Perimeter
Use Group R-1

<table>
<thead>
<tr>
<th>SBC Type of Construction</th>
<th>V 1-Hr.</th>
<th>V Unprotected</th>
<th>III (HT)</th>
<th>VII 1-Hr.</th>
<th>VI Unprotected</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC Multistory Unsprinklered Floor Areas</td>
<td>18,000</td>
<td>12,000</td>
<td>18,000</td>
<td>10,500</td>
<td>7,000</td>
</tr>
<tr>
<td>SBC Multistory Sprinklered Floor Areas</td>
<td>36,000</td>
<td>24,000</td>
<td>36,000</td>
<td>21,000</td>
<td>14,000</td>
</tr>
<tr>
<td>SBC Allowable Stories - Unsprinklered</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>SBC Allowable Stories - Sprinklered</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IBC Type of Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A</td>
</tr>
<tr>
<td>IBC Tabular (Unsprinklered) Areas</td>
</tr>
<tr>
<td>IBC Allowable Stories</td>
</tr>
<tr>
<td>IBC Maximum Stories for Increase</td>
</tr>
</tbody>
</table>

Unsprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>25%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC</td>
<td>90,000</td>
<td>120,000</td>
</tr>
<tr>
<td>IBC</td>
<td>72,000</td>
<td>90,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC</td>
<td>180,000</td>
<td>300,000</td>
</tr>
<tr>
<td>IBC</td>
<td>126,000</td>
<td>252,000</td>
</tr>
</tbody>
</table>

Sprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC</td>
<td>180,000</td>
<td>240,000</td>
<td>300,000</td>
<td>360,000</td>
</tr>
<tr>
<td>IBC</td>
<td>216,000</td>
<td>234,000</td>
<td>252,000</td>
<td>270,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC</td>
<td>192,000</td>
<td>320,000</td>
</tr>
<tr>
<td>IBC</td>
<td>144,000</td>
<td>168,000</td>
</tr>
</tbody>
</table>

The SBC requires a minimum fire separation distance of 30 feet for open space increase; the IBC requires a minimum of 20 feet.
Comparison of IBC-SBC Allowable Building Area Based on Percentage of Open Perimeter

Use Group R-2

<table>
<thead>
<tr>
<th>SBC Type of Construction</th>
<th>V 1-Hr.</th>
<th>V Unprotected</th>
<th>III (HT)</th>
<th>VI 1-Hr.</th>
<th>VI Unprotected</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC Multistory Unsprinklered Floor Areas</td>
<td>18,000</td>
<td>12,000</td>
<td>18,000</td>
<td>10,500</td>
<td>7,000</td>
</tr>
<tr>
<td>SBC Multistory Sprinklered Floor Areas</td>
<td>36,000</td>
<td>24,000</td>
<td>36,000</td>
<td>21,000</td>
<td>14,000</td>
</tr>
<tr>
<td>SBC Allowable Stories - Unsprinklered</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>SBC Allowable Stories - Sprinklered</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IBC Type of Construction</th>
<th>3A</th>
<th>3B</th>
<th>4 (HT)</th>
<th>5A</th>
<th>5B</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBC Tabular (Unsprinklered) Areas</td>
<td>24,000</td>
<td>16,000</td>
<td>20,500</td>
<td>12,000</td>
<td>7,000</td>
</tr>
<tr>
<td>IBC Allowable Stories</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

| IBC Maximum Stories for Increase | 3       | 3             | 3        | 3        | 2             |

Unsprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>IBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>90,000</td>
<td>72,000</td>
</tr>
<tr>
<td>50%</td>
<td>120,000</td>
<td>90,000</td>
</tr>
<tr>
<td>75%</td>
<td>150,000</td>
<td>108,000</td>
</tr>
<tr>
<td>100%</td>
<td>180,000</td>
<td>126,000</td>
</tr>
</tbody>
</table>

Sprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC</th>
<th>IBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>180,000</td>
<td>216,000</td>
</tr>
<tr>
<td>50%</td>
<td>240,000</td>
<td>234,000</td>
</tr>
<tr>
<td>75%</td>
<td>300,000</td>
<td>252,000</td>
</tr>
<tr>
<td>100%</td>
<td>360,000</td>
<td>270,000</td>
</tr>
</tbody>
</table>

*The SBC requires a minimum fire separation distance of 30 feet for open space increase; the IBC requires a minimum of 20 feet*
Comparison of IBC-SBC Allowable Building Area Based on Percentage of Open Perimeter

IBC Use Group S-1 vs SBC Group S-1 Moderate Hazard

<table>
<thead>
<tr>
<th>SBC Type of Construction</th>
<th>V 1-Hr.</th>
<th>V Unprotected</th>
<th>III (HT)</th>
<th>VI 1-Hr.</th>
<th>VI Unprotected</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC Unsprinklered Floor Areas</td>
<td>24,000</td>
<td>16,000</td>
<td>24,000</td>
<td>9,000</td>
<td>6,000</td>
</tr>
<tr>
<td>SBC Sprinklered Floor Areas</td>
<td>48,000</td>
<td>32,000</td>
<td>48,000</td>
<td>27,000</td>
<td>18,000</td>
</tr>
<tr>
<td>SBC Allowable Stories - Unsprinklered</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>SBC Allowable Stories - Sprinklered</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IBC Type of Construction</th>
<th>3A</th>
<th>3B</th>
<th>4 (HT)</th>
<th>5A</th>
<th>5B</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBC Tabular (Unsprinklered) Areas</td>
<td>26,000</td>
<td>17,500</td>
<td>25,500</td>
<td>14,000</td>
<td>9,000</td>
</tr>
<tr>
<td>IBC Allowable Stories</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>IBC Maximum Stories for Increase</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Unsprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC Area</th>
<th>IBC Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>48,000</td>
<td>78,000</td>
</tr>
<tr>
<td></td>
<td>32,000</td>
<td>52,500</td>
</tr>
<tr>
<td></td>
<td>48,000</td>
<td>76,500</td>
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<tr>
<td></td>
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<td>42,000</td>
</tr>
<tr>
<td></td>
<td>6,000</td>
<td>9,000</td>
</tr>
<tr>
<td>50%</td>
<td>64,000</td>
<td>97,500</td>
</tr>
<tr>
<td></td>
<td>42,667</td>
<td>65,625</td>
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<td></td>
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<td>11,250</td>
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<tr>
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<td>80,000</td>
<td>117,000</td>
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<tr>
<td></td>
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<td>114,750</td>
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<td>73,500</td>
</tr>
<tr>
<td></td>
<td>12,000</td>
<td>15,750</td>
</tr>
</tbody>
</table>

Sprinklered Building Aggregate Floor Area (square feet)

<table>
<thead>
<tr>
<th>Percent Open Perimeter</th>
<th>SBC Area</th>
<th>IBC Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>192,000</td>
<td>234,000</td>
</tr>
<tr>
<td></td>
<td>128,000</td>
<td>157,500</td>
</tr>
<tr>
<td></td>
<td>288,000</td>
<td>229,500</td>
</tr>
<tr>
<td></td>
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1 The SBC requires a minimum fire separation distance of 30 feet for open space increase; the IBC requires a minimum of 20 feet.