



FUNDAMENTALS OF FIRE CODE AND EGRESS REQUIREMENTS DURING SCHEMATIC DESIGN



Fire and Egress Design Guide

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Introduction

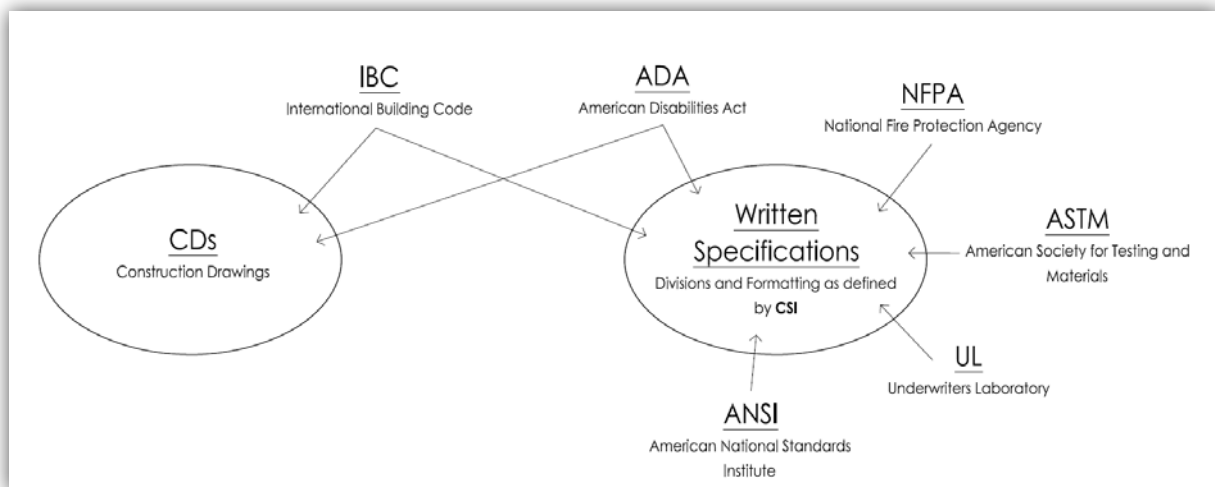
This guide is intended to serve as a reference for architects and project managers *and* as a training tool for interns. The information here can familiarize interns with the necessary resources and research needed at the start of most architectural projects and save the Project Manager time in training/review. The specific code sections and versions noted can also serve as a reference guide for more experienced designers looking for information quickly.

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PART 1: Documents, Resources, and References

PRIMARY DOCUMENTS UTILIZED BY MANUFACTURERS AND SUBCONTRACTORS TO PRICE THEIR PORTION OF THE WORK



The following are included in the CD's and Specifications by reference and design:

IBC – The International Building Code

This is a building code that was developed by the International Code Council (ICC) and is used as a template standard for most jurisdictions in the United States. Different jurisdictions utilize different versions of the code and make their own modifications to meet local requirements and preferences. Here is the current list of states that use the IBC and what version they have adopted (as of 2017).

Please be sure to check your jurisdictions for local variations – for example, New York City code follows IBC 2009, whereas New York State follows IBC 2015.

Alabama – IBC 2015
Alaska – IBC 2012
Arizona – IBC 2012
Arkansas – IBC 2012
California – IBC 2015
Colorado – IBC 2015

Connecticut – IBC 2012
Delaware – IBC 2012
Washington DC – IBC
2012 Florida – IBC 2015
Georgia – IBC 2012
Hawaii – IBC 2006

Idaho – IBC 2015
 Illinois – IBC 2009
 Indiana – IBC 2012
 Iowa – IBC 2015
 Kansas – varies on locality
 Kentucky – IBC 2012
 Louisiana – IBC 2015
 Maine – IBC 2015
 Maryland – IBC 2015
 Massachusetts – IBC 2015
 Michigan – IBC 2015
 Minnesota – IBC 2012
 Mississippi – IBC 2015
 Missouri – IBC 2012
 Montana – IBC 2012
 Nebraska – IBC 2012
 Nevada – IBC 2012
 New Hampshire – IBC 2009
 New Jersey – IBC 2015
 New Mexico – IBC 2015
 New York – IBC 2015
 North Carolina – IBC 2009

North Dakota – IBC 2015
 Ohio – IBC 2015
 Oklahoma – IBC 2015
 Oregon – IBC 2012
 Pennsylvania – IBC 2015
 Rhode Island – IBC 2012
 South Carolina – IBC 2015
 South Dakota – IBC 2015
 Tennessee – IBC 2012
 Texas – varies on locality
 Utah – IBC 2015
 Vermont – IBC 2015
 Virginia – IBC 2012
 Washington – IBC 2015
 West Virginia – IBC 2015
 Wisconsin – IBC 2015
 Wyoming – IBC 2015
 Guam – IBC 2009
 Northern Marianas Islands – IBC 2009
 Puerto Rico – IBC 2009
 U.S. Virgin Islands – IBC 2018

NFPA – National Fire Protection Association

In their own words, “The National Fire Protection Association (NFPA) is a global nonprofit organization, established in 1896, devoted to eliminating death, injury, property and economic loss due to fire, electrical and related hazards.” The NFPA has established more than 300 codes and standards that apply to virtually every building process, service, design and installation. **The following may specifically relate to the architects and spec writer's day to day work:**

NFPA 13	<i>Standard for the Installation of Sprinkler Systems</i>
NFPA 70	<i>National Electric Code</i>
NFPA 72	<i>National Fire Alarm and Signaling Code</i>
NFPA 80	<i>Standard for Fire Doors and Other Opening Protectives</i>
NFPA 80A	<i>Recommended Practice for Protection of Buildings from Exterior Fire Exposures</i>
NFPA 90A	<i>Standard for the Installation of Air Conditioning and Venting Systems</i>
NFPA 92A	<i>Standard for Smoke-Control Systems Utilizing Barriers and Pressure Differences</i>
NFPA 92B	<i>Standard for Smoke Management Systems in Malls, Atria, and Large Spaces</i>
NFPA 99	<i>Health Care Facilities Code</i>
NFPA 101	<i>Life Safety Code®</i>
NFPA 105	<i>Standard for Smoke Door Assemblies and Other Opening Protectives</i>
NFPA 170	<i>Standard for Fire Safety and Emergency Symbols</i>
NFPA 220	<i>Standard on Types of Building Construction</i>
NFPA 221	<i>Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls</i>

NFPA 900	<i>Building Energy Code</i>
NFPA 914	<i>Code for Fire Protection of Historic Structure</i>
NFPA 3000	<i>Standard for an Active Shooter/Hostile Event Response (ASHER) Program</i>

ASTM – The American Society for Testing and Materials

ASTM is an international standards organization founded in 1898 that specializes in voluntary consensus testing and standards. ASTM does not require or enforce compliance with any of its standards, but can be enforced by 3rd parties through contractual agreements. **Although mostly more applicable to the work of engineers, of particular importance to architects are the following sections:**

- *ASTM E84 – Standard Test Methods for Surface Burning Characteristics of Building Materials*
- *ASTM E119 – Standard Test methods for Fire Tests of Building Construction and Materials*

UL – Underwriters Laboratory

UL is a private company founded in 1894 that has become the leader in providing safety evaluation services to multiple organizations, including manufacturers of building products. The UL label on a product certifies that it has undergone strict safety testing under controlled conditions. UL is approved by OSHA as a testing laboratory and the specific test requirements appear frequently in written specifications for building construction projects. Here are a few common UL test standards, **although there are hundreds more that an architect will need to have included by a knowledgeable specification writer:**

- *UL 10B, Standard for Fire Test of Door Assemblies*
- *UL 263, Standard for Fire Tests of Building Construction and Materials*
- *UL 294, Standard for Access Control System Units (Security for Schools and Public Buildings)*
- *UL 1784, Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives*

ANSI – American National Standards Institute

ANSI is a private, non-profit organization founded in 1918 that created and administers voluntary standards for products and related systems. The standards are based on consensus research, making sure that products are used and tested in the same way and use the same definitions and terms across the areas where the standards are used. Important and common ANSI standards for Architects are:

- *ANSI 117.1 (2009) – Accessible and Usable Buildings and Facilities*

ADA – American With Disabilities Act

Signed into law in 1990, the ADA is a civil rights act that prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public. For architects, the most important publication is:

- *2010 ADA Standards for Accessible Design*

NOTE – ANSI 117.1 and ADA refer to and compliment each other for the most part. They are intended to be taken together and implemented into a design.

CSI – Construction Specifications Institute

An organization that has defined the primary system of organizing and defining every part of a construction project from initial concept, through use and maintenance, to final demolition of a building. CSI standards are the primary organizer for information in every project in North America. CSI specifications are utilized by architects and spec writers for the primary purpose of quality control. The use of particular manufacturers in the design is part of the quality control process.

CSI MasterFormat Divisions

- *Division 01 — General Requirements*
- *Division 02 — Existing Conditions*
- *Division 03 — Concrete*
- *Division 04 — Masonry*
- *Division 05 — Metals*
- *Division 06 — Wood, Plastics, and Composites*
- *Division 07 — Thermal and Moisture*
- *Division 08 — Openings – **Won-Door FireGuard is section 08 35 13***
- *Division 09 — Finishes*
- *Division 10 — Specialties – **Won-Door Movable Fire Wall is section 10 22 33***
- *Division 11 — Equipment*
- *Division 12 — Furnishings*
- *Division 13 — Special Construction*
- *Division 14 — Conveying Equipment*

PART 2: Basic Fire & Code Analysis of a Design

This process is best completed during **schematic design** phase as it greatly defines the parameters your project is under and can prevent costly re-design during DD and CD phases.

Step 1. Review Table 506.2 Relative to Your Design

Prepare for the different possibilities - at the start of schematic design, your Occupancy Types, Construction Types, and Allowable Square Footage all come together under **Table 506.2** on Page 17 of this document. As the layout develops this chart will begin to define several different parameters of your building.

Step 2. Identify Occupancies

Identify all relevant occupancies in the new design areas. These are based on the different uses your client requires for different spaces. Determine your required occupancy types from the lists below (note: based on 2015 IBC, confirm with your local version of building code).



USE AND OCCUPANCY CLASSIFICATION
(REFERENCE: 2015 IBC – CHAPTER 3)

SECTION 303 - ASSEMBLY GROUP A	
Assembly Group A-1	<ul style="list-style-type: none"> • Motion picture theaters • Symphony and concert halls • Television and radio studios admitting an audience • Theaters
Assembly Group A-2	<ul style="list-style-type: none"> • Banquet halls • Casinos (gaming areas) • Nightclubs • Restaurants, cafeterias and similar dining facilities (including associated commercial kitchens) • Taverns and bars
Assembly Group A-3	<ul style="list-style-type: none"> • Amusement arcades • Art galleries • Bowling alleys • Community halls • Courtrooms • Dan halls (not including food or drink consumption) • Exhibition halls • Funeral parlors • Gymnasiums (without spectator seating) • Indoor swimming pools (without spectator seating) • Indoor tennis courts (without spectator seating) • Lecture halls • Libraries • Museums • Places of religious worship • Pool and billiard parlors • Waiting areas in transportation terminals
Assembly Group A-4	<p>Arenas Skating rinks Swimming pools Tennis courts</p>
Assembly Group A-5	<p>Amusement park structures Bleachers Grandstands Stadiums</p>

SECTION 304 - BUSINESS GROUP B

- Airport traffic control towers
- Ambulatory care facilities
- Animal hospitals, kennels and pounds
- Banks
- Barber and beauty shops
- Car wash
- Civic administration
- Clinic, outpatients
- Dry cleaning and laundries: pick-up and delivery stations and self-service
- Educational occupancies for students above the 12th grade
- Electronic data processing
- Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities not more than 2,500 square feet (232m²) in area
- Laboratories: testing and research
- Motor vehicle showrooms
- Post offices
- Print shops
- Professional services (architects, attorneys, dentists, physicians, engineers, etc.
- Radio and television stations
- Telephone exchanges
- Training and skill development not in a school or academic program (this shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics and similar uses regardless of the ages served, and where not classified as a Group A occupancy

SECTION 305 – EDUCATIONAL GROUP E

305.1 Educational Group E	Educational Group E occupancy includes, among others, the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12 th grade.
305.2 Group E, Day Care Facilities	This group includes buildings and structures or portions thereof occupied by more than five children older than 2 ½ years of age who receive educational, supervision or personal care services for fewer than 24 hours per day.

SECTION 306 – FACTORY GROUP	
Factory Group F-1	<ul style="list-style-type: none"> • Aircraft (manufacturing, not to include repair) • Appliances • Athletic equipment • Automobiles and other motor vehicles • Bakeries • Beverages: over 16-percent alcohol content • Bicycles • Boats • Brooms or brushes • Business machines • Cameras and photo equipment • Canvas or similar fabric • Carpets and rugs (includes cleaning) • Clothing • Construction and agricultural machinery • Disinfectants • Dry cleaning and dyeing • Electric generation plants • Electronics • Engines (including rebuilding) • Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities more than 2,500 square feet (232 m²) in area • Furniture • Hemp products • Jute products • Laundries • Leather products • Machinery • Metals Millwork (sash and door) • Motion pictures and television filming (without spectators) • Musical instruments • Optical goods • Paper mills or products • Photographic film • Plastic products • Printing or publishing • Recreational vehicles • Refuse incineration • Shoes • Soaps and detergents • Textiles • Tobacco • Trailers • Upholstering • Wood; distillation • Woodworking (cabinet)

SECTION 306 – FACTORY GROUP - CONTINUED	
Factory Group F-2	<ul style="list-style-type: none"> Brick and masonry Ceramic products Foundries Glass products Gypsum Ice Metal products (fabrication and assembly)

SECTION 307 – HIGH-HAZARD GROUP H
The H occupancy is too complicated for the purposes of this guide. See Section 307 in IBC 2015

SECTION 308 – INSTITUTIONAL GROUP I	
Institutional Group I-1	<ul style="list-style-type: none"> • Boarding houses • Halfway houses • Group homes • Congregate care facilities • Social rehabilitation facilities • Alcohol and drug abuse centers • Convalescent facilities
Institutional Group I-2	<ul style="list-style-type: none"> • Assisted living facilities • Hospitals • Nursing homes (both intermediate care facilities and skilled nursing facilities) • Mental hospitals • Detoxification facilities
Institutional Group I-3	<ul style="list-style-type: none"> • Prisons • Jails • Reformatories • Detention centers • Correctional centers • Pre-release centers
Institutional Group I-4	<ul style="list-style-type: none"> • Adult day care • Child day care

SECTION 309 – MERCANTILE GROUP M	
	<ul style="list-style-type: none"> • Department stores • Drug stores • Markets • Motor fuel-dispensing facilities • Retail or wholesale stores • Sales rooms

SECTION 310 – RESIDENTIAL GROUP R	
Residential Group R-1	<ul style="list-style-type: none"> • Boarding houses (transient) with more than 10 occupants • Congregate living facilities (transient) with more than 10 occupants • Hotels (transient) • Motels (transient)
Residential Group R-2	<ul style="list-style-type: none"> • Apartment houses • Boarding houses (non-transient) with more than 16 occupants • Congregate living facilities (non-transient) with more than 16 occupants • Convents • Dormitories • Fraternities and sororities • Hotels (non-transient) • Live/work units • Monasteries • Motels (non-transient) • Vacation timeshare properties
Residential Group R-3	<ul style="list-style-type: none"> • Buildings that do not contain more than two dwelling units • Boarding houses (non-transient) with 16 or fewer occupants • Boarding houses (transient) with 10 or fewer occupants • Care facilities that provide accommodations for five or fewer persons receiving care • Congregate living facilities (non-transient) with 16 or fewer occupants • Congregate living facilities (transient) with 10 or fewer occupants • Lodging houses with five or fewer guest rooms
Residential Group R-4	<ul style="list-style-type: none"> • Alcohol and drug centers • Assisted living facilities • Congregate care facilities • Group homes • Halfway houses • Residential board and care facilities • Social rehabilitation facilities

SECTION 311 – STORAGE GROUP S	
Storage Group S-1	<ul style="list-style-type: none"> • Aerosols, Levels 2 and 3 • Aircraft hangar (storage and repair) • Bags: cloth, burlap and paper • Bamboos and rattan • Baskets • Belting: canvas and leather • Books and paper in rolls or packs • Boots and shoes • Buttons, including cloth covered, pearl or bone • Cardboard and cardboard boxes • Clothing, woolen wearing apparel • Cordage • Dry boat storage (indoor) • Furniture • Furs • Glues, mucilage, pastes and size • Grains • Horns and combs, other than celluloid • Leather • Linoleum • Lumber • Motor vehicle repair garages complying with the maximum allowable quantities of hazardous materials listed in Table 307.1 (1) (see Section 406.8) • Photo engravings • Resilient flooring • Silks • Soaps • Sugar • Tires, bulk storage of • Tobacco, cigars, cigarettes and snuff • Upholstery and mattresses • Wax candles
Storage Group S-2	<ul style="list-style-type: none"> • Asbestos • Beverages up to and including 16-percent alcohol in metal, glass or Ceramic containers • Cement in bags • Chalk and crayons • Dairy products in non-waxed coated paper containers • Dry cell batteries • Electric coils • Electrical motors • Empty cans • Food products • Foods in non-combustible containers • Fresh fruits and vegetables in non-plastic trays or containers • Frozen foods • Glass • Glass bottles, empty or filled with non-combustible liquids • Gypsum board • Inert pigments

	SECTION 311 - STORAGE GROUP S2 CONTINUED <ul style="list-style-type: none"> • Ivory • Meats • Metal cabinets • Metal desks with plastic tops and trim • Metal parts • Metals • Mirrors • Oil-filled and other types of distribution transformers • Parking garages, open or enclosed • Porcelain and pottery • Stoves • Talc and soapstones • Washers and dryers
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SECTION 312 – UTILITY AND MISCELLANEOUS GROUP U	
	<ul style="list-style-type: none"> • Agricultural buildings • Aircraft hangars, accessory to a one- or two-family residence (see Section 412.5) • Barns • Carports • Fences more than 6 feet (1829 mm) in height • Grain silos, accessory to a residential occupancy • Greenhouses • Livestock shelters • Private garages • Retaining walls • Sheds • Stables • Tanks • Towers

Step 3. Identify Construction Type

This will depend on if your project is a renovation, addition, or new construction. Then, the construction type is the first design decision that greatly impacts budget:

- **Renovations** – identify the existing construction type via field inspections or from the existing drawings, see types below.
- **Additions and New Construction** – decide on possible construction types based on the allowable square footage numbers in **Table 506.2** (page 17) or your preferred structural design materials.

Value Engineering Tip: increasing compartmentalization can decrease construction type requirements and construction costs. Large open spaces and compartmentalization can both be achieved through the use of horizontal sliding fire doors that create the separations during alarm only. During standard use, the spaces are connected through a large opening (Won-Door is capable of heights up to 28' and virtually unlimited in length).

Figure 1
2015 IBC Chapter 6 - Types of Construction

TYPE I-A--Fire Resistive Non-combustible
3 Hr. Exterior Walls*
3 Hr. Structural Frame
2 Hr. Floor/Ceiling Assembly
1 ½ Hr. Roof Protection

TYPE I-B--Fire Resistive Non-Combustible
2 Hr. Exterior Walls*
2 Hr. Structural Frame
2 Hr. Ceiling/Floor Separation
1 Hr. Ceiling/Roof Assembly

TYPE II-A--Protected Non-Combustible
1 Hr. Exterior Walls
1 Hr. Structural Frame
1 Hr. Floor/Ceiling/Roof Protection

TYPE II-B--Unprotected Non-Combustible

Building constructed of non-combustible materials but these materials have no fire resistance.

TYPE III-A--Protected Combustible

2 Hr. Exterior Walls*
1 Hr. Structural Frame
1 Hr. Floor/Ceiling/Roof Protection

TYPE III-B--Unprotected Combustible

2 Hr. Exterior Walls*
No fire resistance for structural frame, floors, ceilings, or roofs.

TYPE IV--Heavy Timber

2 Hr. Exterior Walls*
1 Hr. Structural Frame or Heavy Timber
Heavy Timber Floor/Ceiling/Roof Assemblies

TYPE V-A--Protected Wood Frame (

1 Hr. Exterior Walls
1 Hr. Structural Frame
1 Hr. Floor/Ceiling/Roof

TYPE V-B--Unprotected Wood Frame

- Note exceptions in the building code for fire resistance ratings of exterior walls and opening protection.

Figure 2
2015 IBC Chapter 5 – General Building heights and Areas
TABLE 506.2

TABLE 506.2^{a, b} ALLOWABLE AREA FACTOR (A_f = NS, S1, S13R, or SM, as applicable) IN SQUARE FEET

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION									
		TYPE I		TYPE II		TYPE III		TYPE IV		TYPE V	
		A	B	A	B	A	B	HT	A	B	
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500	
	S1	UL	UL	62,000	34,000	56,000	34,000	80,000	46,000	22,000	
	SM	UL	UL	46,500	25,500	42,000	25,500	45,000	34,500	16,500	
A-2	NS	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	8,000	
	S1	UL	UL	62,000	38,000	56,000	38,000	80,000	46,000	24,000	
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000	
A-3	NS	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	8,000	
	S1	UL	UL	62,000	38,000	56,000	38,000	80,000	46,000	24,000	
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000	
A-4	NS	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	8,000	
	S1	UL	UL	62,000	38,000	56,000	38,000	80,000	46,000	24,000	
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000	
A-5	NS										
	S1										
	SM										
B	NS	UL	UL	37,800	23,000	28,500	16,000	36,000	18,000	9,000	
	S1	UL	UL	150,000	82,000	114,000	67,000	144,000	72,000	36,000	
	SM	UL	UL	112,500	66,000	85,500	57,000	108,000	54,000	27,000	
E	NS	UL	UL	26,500	14,500	23,500	14,500	25,500	18,500	9,500	
	S1	UL	UL	106,000	59,000	94,000	59,000	102,000	74,000	38,000	
	SM	UL	UL	79,500	43,500	70,500	43,500	78,500	55,500	28,500	
F-1	NS	UL	UL	25,000	15,500	16,000	12,000	33,500	14,000	8,500	
	S1	UL	UL	100,000	82,000	78,000	46,000	134,000	88,000	34,000	
	SM	UL	UL	75,000	46,500	57,000	36,000	100,500	42,000	25,500	
F-2	NS	UL	UL	37,800	23,000	28,500	18,000	50,500	21,000	13,000	
	S1	UL	UL	150,000	82,000	114,000	72,000	202,000	84,000	52,000	
	SM	UL	UL	112,500	66,000	85,500	54,000	151,500	83,000	39,000	
H-1	NS ^c	UL	UL	21,000	16,500	11,000	7,000	9,500	7,500	NP	
	S1	UL	UL	21,000	16,500	11,000	7,000	10,500	7,500	3,000	
H-2	NS ^c										
	S1	UL	UL	21,000	16,500	11,000	7,000	9,500	7,500	3,000	
	SM										
H-3	NS ^c										
	S1	UL	UL	80,000	26,500	14,000	17,500	13,000	25,500	10,000	
	SM										
H-4	NS ^{c, d}	UL	UL	37,800	17,500	26,500	17,500	36,000	18,000	8,500	
	S1	UL	UL	150,000	70,000	114,000	70,000	144,000	72,000	26,000	
	SM	UL	UL	112,500	52,500	85,500	52,500	108,000	54,000	19,500	
H-5	NS ^{c, d}	UL	UL	37,800	23,000	28,500	19,000	36,000	18,000	9,000	
	S1	UL	UL	150,000	82,000	114,000	78,000	144,000	72,000	36,000	
	SM	UL	UL	112,500	66,000	85,500	57,000	108,000	54,000	27,000	

TABLE 506.2^{a, b}—continued ALLOWABLE AREA FACTOR (A_f = NS, S1, S13R, or SM, as applicable) IN SQUARE FEET

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION									
		TYPE I		TYPE II		TYPE III		TYPE IV		TYPE V	
		A	B	A	B	A	B	HT	A	B	
I-1	NS ^{a, e}	UL	65,000	19,000	10,000	16,500	10,000	18,000	10,500	4,500	
	S1	UL	220,000	78,000	40,000	86,000	40,000	72,000	42,000	18,000	
	SM	UL	165,000	57,000	30,000	49,500	30,000	54,000	31,500	13,500	
I-2	NS ^{a, f}	UL	15,000	11,000	12,000	NP	12,000	9,500	NP	NP	
	S1	UL	80,000	44,000	48,000	NP	48,000	38,000	NP	NP	
	SM	UL	45,000	33,000	36,000	NP	36,000	28,500	NP	NP	
I-3	NS ^{a, g}	UL	15,000	10,000	10,500	7,500	12,000	7,500	5,000	5,000	
	S1	UL	45,000	40,000	42,000	30,000	48,000	30,000	20,000	20,000	
	SM	UL	45,000	30,000	31,500	22,500	36,000	22,500	15,000	15,000	
I-4	NS ^{a, h}	UL	60,500	25,500	13,000	23,500	13,000	25,500	18,500	9,000	
	S1	UL	121,000	109,000	52,000	64,000	52,000	102,000	74,000	36,000	
	SM	UL	181,500	79,500	36,000	70,500	36,000	78,500	55,500	27,000	
M	NS	UL	21,500	12,500	18,500	12,500	20,500	14,000	9,000	9,000	
	S1	UL	86,000	50,000	74,000	50,000	82,000	56,000	36,000	36,000	
	SM	UL	64,500	37,500	55,500	37,500	61,500	42,000	27,000	27,000	
R-1	NS ^{a, i}	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000	7,000	
	S13R	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000	7,000	
	S1	UL	86,000	84,000	86,000	84,000	82,000	48,000	38,000	38,000	
R-2	NS ^{a, j}	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000	7,000	
	S13R	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000	7,000	
	S1	UL	86,000	84,000	86,000	84,000	82,000	48,000	38,000	38,000	
R-3	NS ^{a, k}	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000	7,000	
	S13R	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000	7,000	
	SM	UL	86,000	84,000	86,000	84,000	82,000	48,000	38,000	38,000	
R-4	NS ^{a, l}	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000	7,000	
	S13R	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000	7,000	
	S1	UL	86,000	84,000	86,000	84,000	82,000	48,000	38,000	38,000	
S-1	NS	UL	48,000	28,000	17,500	28,000	17,500	25,500	14,000	9,000	
	S1	UL	192,000	104,000	70,000	114,000	70,000	122,000	66,000	36,000	
	SM	UL	144,000	78,000	52,500	78,000	52,500	78,500	42,000	27,000	
S-2	NS	UL	79,000	39,000	36,000	39,000	36,000	38,600	21,000	13,500	
	S1	UL	316,000	156,000	104,000	156,000	104,000	154,000	84,000	54,000	
	SM	UL	237,000	117,000	78,000	117,000	78,000	115,500	63,000	40,500	
U	NS	UL	35,500	19,000	8,500	14,000	8,500	18,000	9,000	5,500	
	S1	UL	142,000	78,000	34,000	58,000	34,000	72,000	36,000	22,000	
	SM	UL	108,500	57,000	25,500	42,000	25,500	54,000	27,000	16,500	

Note: UL = Unlimited; NP = Not permitted.

For S1: 1 square foot = 0.0929 m².

NS = Buildings not equipped throughout with an automatic sprinkler system; S1 = Buildings a maximum of one story above grade plane equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; SM = Buildings two or more stories above grade plane equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2.

a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.

b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.

c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.

d. The NS value is only for use in evaluation of existing building area in accordance with the International Existing Building Code.

e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8. For new Group I-1 occupancies, Condition 1, see Exception 1 of Section 903.2.8.

f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8 and Section 1103.5 of the International Fire Code.

g. New Group I-4 occupancies see Exceptions 2 and 3 of Section 903.2.8.

h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.

Step 4. Identify Smoke and Fire Compartments

Locate your fire walls, barriers and partitions. (also smoke compartments if required). Here are some important notes:

**Figure 3 – Full size chart provided on page 31 of this document
2015 IBC Chapter 7 – Fire and Smoke Protection Features**

FIRE WALL vs. FIRE BARRIER vs. FIRE PARTITION			
	FIRE WALL, IBC 706 (INCL. PARTY WALL)	FIRE BARRIER, IBC 707	FIRE PARTITION, IBC 708
GRAPHICS			
CONSTRUCTION & CONTINUITY	Foundation through roof, exterior wall to exterior wall. Fire walls at roofs must extend 30" above adjacent construction. Fire walls at exterior walls shall extend not less than 18" with adjacent walls constructed of 1 hour rated materials. (Section 706.5, 706.4, 2015 IBC)	from top of foundation or floor/ceiling assembly below, to the underside of the floor/roof/slab/deck above. (Section 707.5, 2015 IBC)	from top of foundation or floor/ceiling assembly below, to the underside of the floor/roof/slab/deck above. OR to the fire resistance rated floor/ceiling assembly. Concealed spaces must be fireblocked or draftstopped (Section 708.4, 2015 IBC)
PROPERTIES	must maintain protection between separate building during fire, without collapse, even if they are attached to other structural elements that may collapse.	resist fire between spaces within a building for a required period of time	resist fire between spaces within a building for a required period of time
WHERE REQUIRED	Between 2 separate buildings that are connected.	Separating vertical and horizontal egress, shafts, mixed occupancies, exterior walls where required. Our E119 tested wall is applicable here if 25% or 156 sf needs to be exceeded. Our TR Wall is used for egress paths and stairways.	between adjacent residential occupancies, tenant spaces in mall buildings, corridor walls
OPENINGS (see table 716.5, 2015 IBC)	<p>Non-Sprinklered - protected openings, up to 120 sf, width not to exceed 25% width of wall</p> <p>Sprinklered - protected openings, may exceed 120 sf but width must still remain \leq 25% width of wall</p> <p>Party Walls - Fire Walls on lot lines may not have any openings. However, the lot line may not be considered if both properties are owned by the same entity and the wall is opened for the purpose of combined use.</p>	<p>Void adjacent to barrier must be protected</p> <p>Non-Sprinklered - protected openings, up to 156 sf, width not to exceed 25% width of wall (707.6, 2015 IBC)</p> <p>Sprinklered - protected openings, may exceed 156 sf but width must still remain \leq 25% width of wall (707.4, 2015 IBC)</p> <p>May exceed 156 sf and 25% width of wall if the opening is a fire door serving fire enclosures (707.4, 2015 IBC)</p> <p>May exceed 156 sf and 25% width of wall if the opening has been tested in accordance with ASTM E119 or UL 263 and is rated equal or higher than the fire wall (707.6, 2015 IBC)</p> <p>May exceed 25% width of wall if the opening is part of a fire window assembly in an atrium separation wall. (707.4, 2015 IBC)</p>	openings are permitted with a minimum rating of 1 hour (Table 716.5, 2015 IBC)
RATINGS	2, 3, 4 hours	1, 2, 3, 4 hours	Fire Resistance \geq 1 hour (with exceptions noted in 708.3)

- **Use a Fire Wall if:**
 1. You want to create or maintain 2 separate buildings. Refer to Area Allowances for your Occupancy type to see how much space is permitted (IBC Table 506.2, shown on pg. 14 of this document)
 2. You want to increase compartmentalization to reduce construction type (see Table 506.2 on page 17)
- **Use a Fire Barrier if:**
 1. You need to separate occupancies on the same floor.*
 2. You are designing a shaft or fire stair enclosure
 3. A renovation has an existing barrier – you cannot decrease the existing safety
 4. You want to increase compartmentalization to reduce sprinkler requirements
 5. As required by code. (see green colored chart below)

If multiple occupancies occur in a single space, they need **not be separated if each type represents 10% or less of the main occupancy. (Code Section) Occupancy Types that are not the main occupancy type are considered "accessory occupancies".¹*

**If an accessory occupancy is more than 10% of the floor area of the main occupancy, fire separations must be used. (Code Section)*

- **Use a Fire Partition if:**

6. You are separating dwelling units in the same building
7. You are separating sleeping units in occupancies Group R-1 Hotel, R-2, and I1 Occupancies
8. Separating tenant spaces in covered mall buildings
9. Corridor walls in all non-single family buildings
10. Elevator lobby separations

Value Engineering Tip: The intent of the accessory occupancy provisions recognizes that buildings often have rooms or spaces different from but accessory to the main occupancy. When such areas are large in size (more than 10% of the floor area), they represent a significantly different hazard or risk as compared to that of the main occupancy. As such, the code requires the accessory occupancy to be separated from the main occupancy .

**Figure 4 – Full size chart provided on page 32 of this document
Fire Code Requirements of Different Design Elements**

	BASED ON 2015 IBC
Elevator Lobbies	Required in all buildings where 3 or more stories are connected by elevator, no sprinkler is present, groups I-1 I-2 I-3, or high rise more than 75' (3006.2). Lobby may be omitted if shaft is pressurized or smoke doors used at access point to elevator car (3006.3, exceptions 3 & 4)
Escalators	Require shaft enclosure as per 3004.2.1. If building has sprinkler system, you may use draft curtain or automatic shutters as per 712.1.3 - 712.1.3.2. Two (2) hour fire barrier is required for shafts penetrating 4 or more stories, and no less than 1 hour fire barrier for shafts penetrating less than 4 stories per section 713.4
Atriums	Atriums connect 2 or more floors (Chapter 2 Definitions). Atrium requirements noted below may be omitted by using emergency fire doors to turn an atrium into a shaft: - atrium spaces must be separated from adjacent spaces by a 1 hour fire barrier (404.6) - interior finishes of entire atrium must be no less than Class B (404.8) - no more than 200' travel distance (404.9.3) - use of mechanical smoke purge system (404.5) - full building sprinkler protection (404.3) - see also Exception 1
Stair Enclosures	Shaft Enclosure required if the stair is used as a means of egress per 1023.2. Two (2) hour fire barrier is required for shafts penetrating 4 or more stories, and no less than 1 hour fire barrier for shafts penetrating less than 4 stories per section 1023.2
Exit Enclosures (AKA Exit Passageways)	Required as needed to continue any protected egress path to the exterior via a fully protected passageway. Required to comply with section 1024.
Area Separations	Required between buildings as fire walls or between occupancies as fire barriers based on square footage or construction type as noted in Table 506.2
Double Egress Doors	Where egress or double egress is required see section 1010.1.4.3.
Temperature Rise Doors (Labeled "T" as per NFPA 252 or UL10B)	Required in non-sprinklered buildings in the exit stairs and exit passageways as per 716.5.5
ASTM E119 or UL263 Rated Openings (Labeled "W")	Required if more than 156sf or 25% of a fire barrier is utilized as an opening as per 707.6, exception 3.
Fire Service Access Elevator	Required where an occupied floor is more than 120' above FD vehicle access as per 403.6.1. Lobbies shall be enclosed 1 hour as per 3007.6.2 and the doors shall be tested without an artificial bottom seal as per NFPA 1784 - Section 3007.6.3
Occupant Evacuation Elevators	May be utilized as part of the evacuation plan in compliance with section 3008. Lobbies shall be enclosed 1 hour as per 3008.6.1
This chart is for reference only and provided as a general guide to assist in finding the applicable sections of code. It is the responsibility of the designer to confirm local requirements and the applicability of code reference to their particular project.	

Step 5. Locate Openings In Your File Walls, Barriers and Partitions

Define primary egress paths to ensure that your schematic layout will work
– travel distances are defined here:

Figure 5
2015 IBC Chapter 10 – Means of Egress

TABLE 1017.2
EXIT ACCESS TRAVEL DISTANCE^a

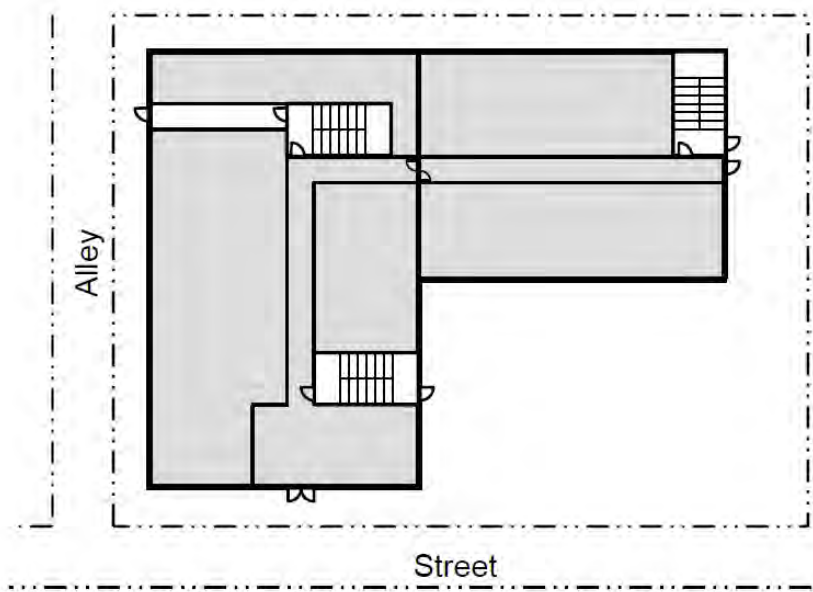
OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)	WITH SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200	250 ^b
I-1	Not Permitted	250 ^b
B	200	300 ^c
F-2, S-2, U	300	400 ^c
H-1	Not Permitted	75 ^d
H-2	Not Permitted	100 ^d
H-3	Not Permitted	150 ^d
H-4	Not Permitted	175 ^d
H-5	Not Permitted	200 ^c
I-2, I-3, I-4	Not Permitted	200 ^c

Components of the exit system are defined here (per 2015 IBC)

Means of Egress – The means of egress includes three distinct design components, the exit access, exit and exit discharge. Although it is commonplace to utilize the work “exit”, the “exit” is only one component of the overall means of egress system.

1. Exit Access
2. Exit
3. Exit Discharge

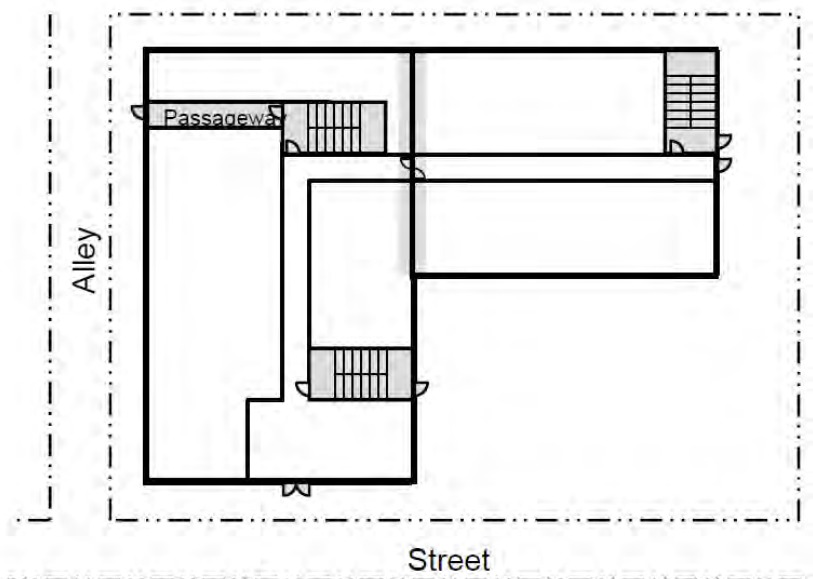
As shown in the graphics below:



Shaded area = exit access

Shaded Area = Exit Access

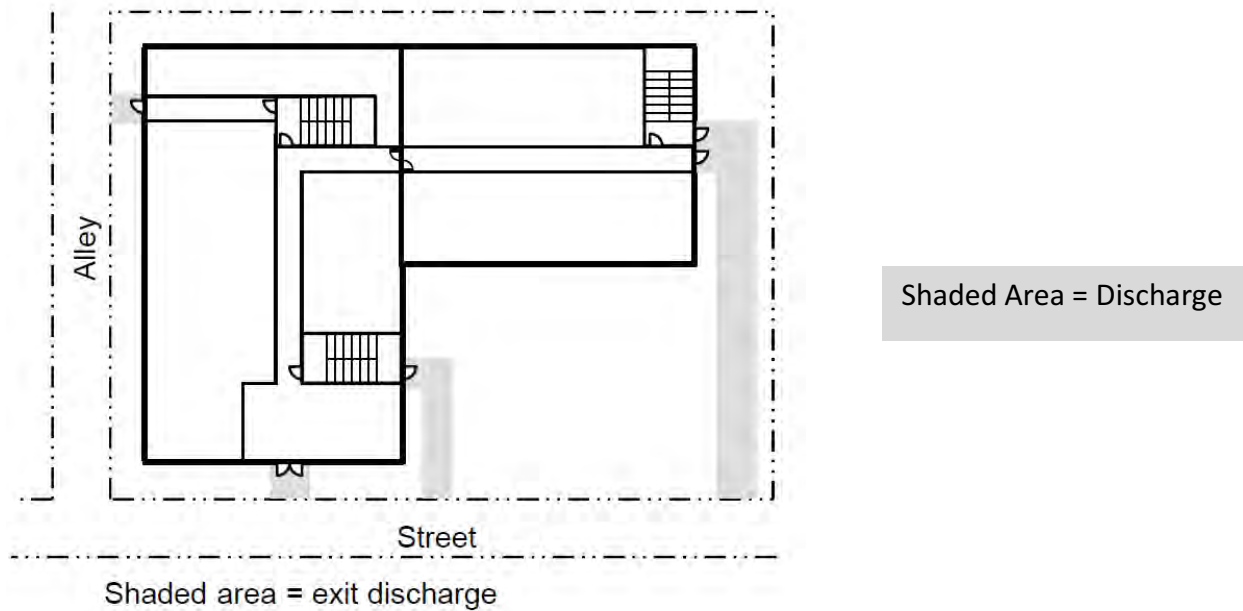
*** Horizontal Sliding Fire Doors can be utilized in the highlighted areas**



Shaded area = exit

Shaded Area = Exit

*** Horizontal Sliding Fire Doors can be utilized in the highlighted areas**



Horizontal Exit - A horizontal exit is defined as “an exit component consisting of fire-resistance-rated construction and opening protectives intended to compartmentalize portions of a building thereby creating refuge areas that afford safety from the fire and smoke from the area of fire origin.”

Interior Exit Stairway - An interior exit stairway is defined as “an exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and provides for a protected path of egress travel to the exit discharge or public way.”

Exit Access Stairway – A circulating stair between floor levels not utilized for primary egress. Limitation is 2 levels atmospherically connected. Horizontal Sliding Fire Doors (with Smoke Label) can be utilized to atmospherically isolate intermediate floors on a circulating stair that spans more than 2 levels.

Exit Passageway - An exit passageway is defined as “an exit component that is separated from other interior spaces of a building or structure by fire-resistance rated construction and opening protectives, and provides for a protected path of egress travel in a horizontal direction to an exit or to the exit discharge.” This often appears as a tunnel on the floor plan which may block circulations, valuable space, or views. Horizontal sliding fire doors may be utilized to have these “tunnels” appear only during alarm situations so that that space may be used for circulation or views at other times.

Opening sizes allowed in Fire Walls, Fire Barriers, and Fire Partitions are limited in sections 706, 707, & 708 of 2015 IBC. See Figure 3 on Page 19 of this guide.

Step 6. Confirm Ratings and Sizes of All Protected Opening Are Code Compliant

- The allowable size openings are detailed on Chart 1.
- Rule of thumb 1 – openings cannot exceed 25% the lineal foot of the wall, aggregate as measured in plan (Fire Walls and Fire Barriers)
- Rule of Thumb 2 – in non-sprinklered buildings, each opening may be as large as 156 sf as measured in elevation
- Rule of thumb 3 – in sprinklered buildings, there is no limitation on the sf of an opening (but 25% rule still applies)
- Rule of thumb 4 – if the opening sizes exceed the limitations, consider a product type that is approved per ASTM E119 per 706.2 exception 3.

The hourly ratings of your opening are defined on the following page:



Figure 6
2015 IBC Chapter 7 – Fire and Smoke Protection Features
Opening Fire Protection Assemblies, Ratings and Markings

TABLE 716.5
OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE ^b	FIRE-RATED GLAZING MARKING DOOR VISION PANEL ^d	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDELIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4	3	See Note b	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3	3 ^a	See Note b	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	2	1½	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in. = D-H-W-90	Not Permitted	2	Not Permitted	W-120
	1½	1½	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in. = D-H-W-90	Not Permitted	1½	Not Permitted	W-90
Enclosures for shafts, interior exit stairways and interior exit ramps.	2	1½	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in. = D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Horizontal exits in fire walls ^c	4	3	100 sq. in.	≤100 sq. in. = D-H-180 >100 sq. in. = D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3	3 ^a	100 sq. in.	≤100 sq. in. = D-H-180 >100 sq. in. = D-H-W-180	Not Permitted	3	Not Permitted	W-180
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1	1	100 sq. in. ^c	≤100 sq. in. = D-H-60 >100 sq. in. = D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
					Fire protection			
Other fire barriers	1	¾	Maximum size tested	D-H	¾		D-H	
Fire partitions: Corridor walls	1	⅓ ^b	Maximum size tested	D-20	¾ ^b		D-H-OH-45	
	0.5	⅓ ^b	Maximum size tested	D-20	⅓		D-H-OH-20	
Other fire partitions	1	¾	Maximum size tested	D-H-45	¾		D-H-45	
	0.5	⅓	Maximum size tested	D-H-20	⅓		D-H-20	

**TABLE 716.5—continued
OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS**

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE RATED GLAZING MARKING DOOR VISION PANEL ^e	MINIMUM SIDELIGHT/ TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDELITE/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
Exterior walls	3	1½	100 sq. in. ^c	≤100 sq.in.= D-H-90 >100 sq.in.= D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2	1½	100 sq. in. ^c	≤100 sq.in.= D-H-90 >100 sq.in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
					Fire Protection			
	1	¾	Maximum size tested	D-H-45	¾		D-H-45	
Smoke barriers					Fire protection			
	1	1/3 ^b	Maximum size tested	D-20	¾		D-H-OH-45	

For SI: 1 square inch = 645.2 mm.

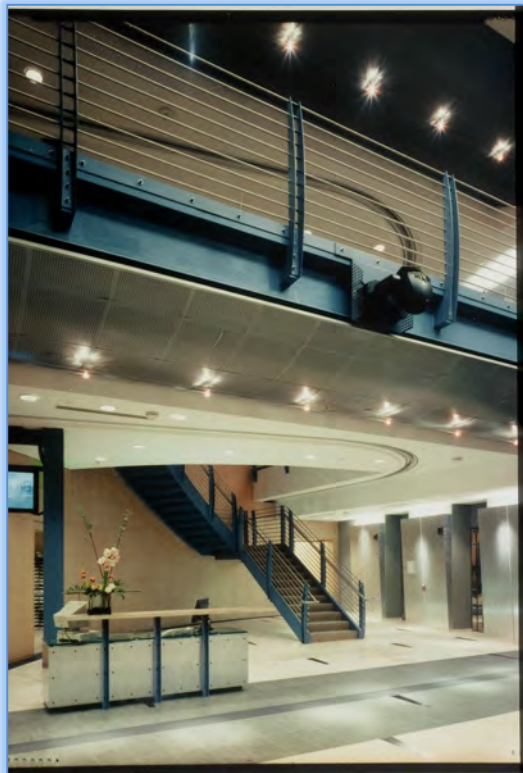
a. Two doors, each with a fire protection rating of 1½ hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

b. For testing requirements, see Section 716.6.3.

c. Fire-resistance-rated glazing tested to [ASTM E119](#) in accordance with Section 716.2 shall be permitted, in the maximum size tested.

d. Except where the building is equipped throughout with an automatic sprinkler and the fire-rated glazing meets the criteria established in Section 716.5.5.

e. Under the column heading "Fire-rated glazing marking door vision panel," W refers to the fire-resistance rating of the glazing, not the frame.

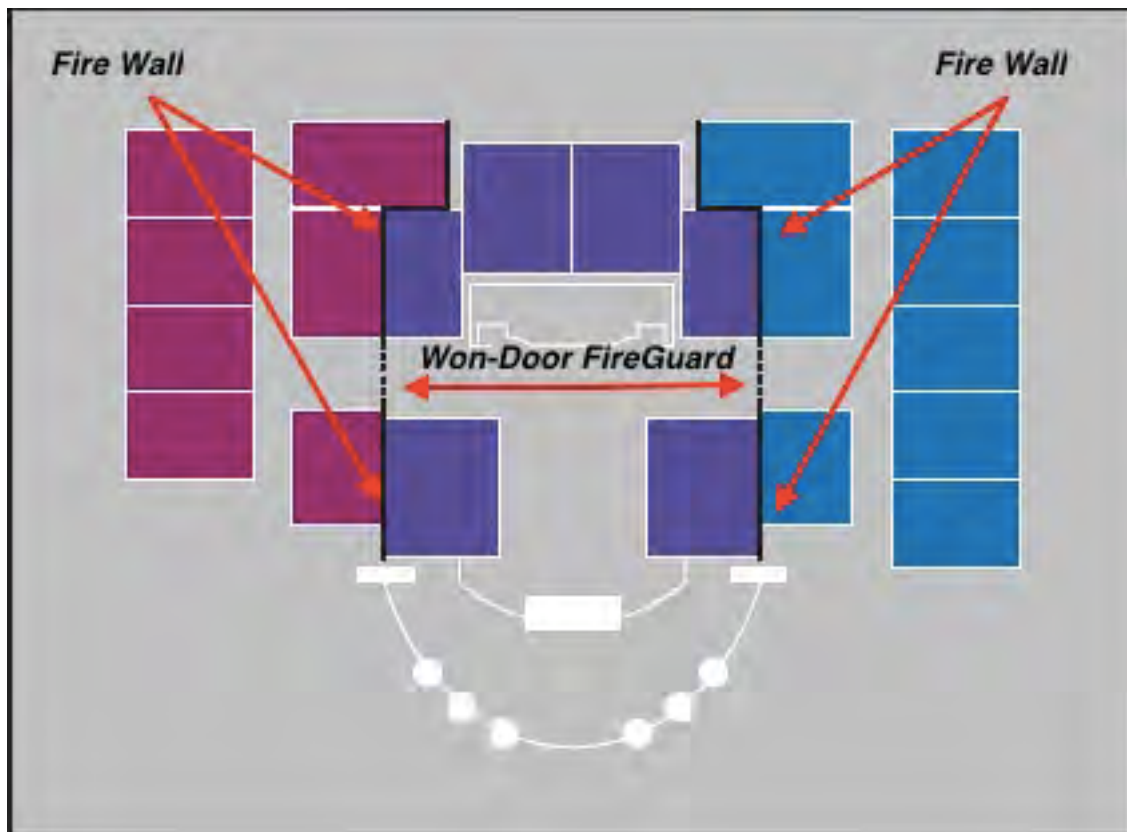


Step 7. Review Your Final Square Footages and Construction Types for Budget Purposes

Check the square footage of your schematic layout on Table 506.2 to determine the minimum construction type allowed.

- This table applies to the main occupancy type. Accessory occupancies are not included.
- Lower construction types (ie. Type 1) will represent a higher budget. Higher construction types (ie. Type 5) will represent a lower budget

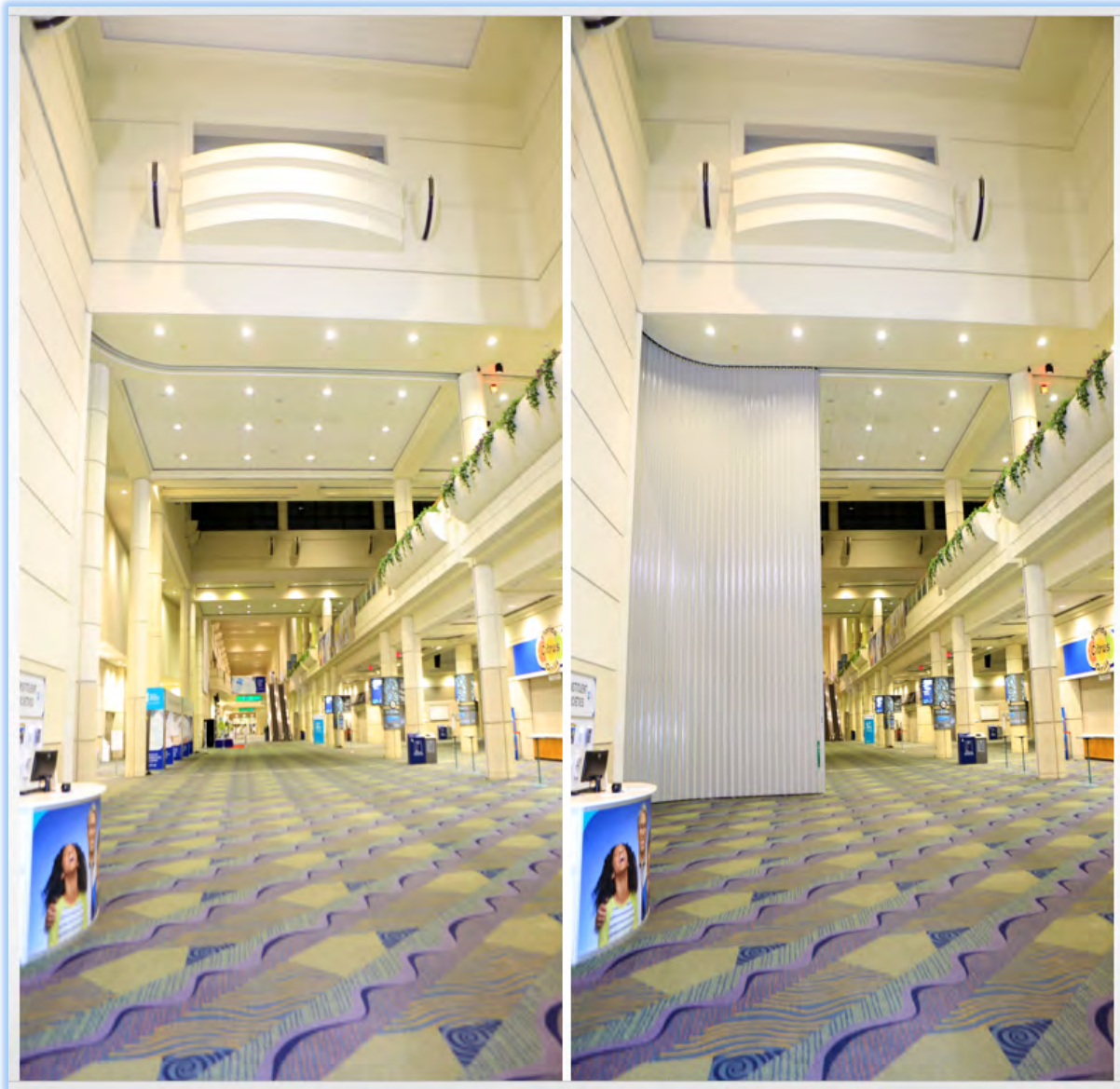
Value Engineering Tip: If required program area is too large to meet the desired construction type, consider the use of fire walls to break the layout up into multiple separate “buildings”. Increasing the compartmentalization will allow you to reduce the construction type. Floor plan can be left open for circulation utilizing openings in the fire walls.



PART 3: Design Opportunities

Won-Door allows compartmentalized spaces to remain open to each other during non-alarm situations. The compartmentalization occurs only during alarms and allows occupants to pass through as needed. The image below shows a large continuous space that utilizes this capability to connect spaces.

CONNECTING SPACES



PART 4: Additional Information

Is Won-Door a door or a wall?

Won-Door may be used as either an “opening protective” (Fireguard model) or a “movable wall” (MFW model). The movable wall is used if the opening size(s) in the separation exceed what is allowed by code and the designer has chosen to utilize exception 3 from section 707.6 (2015 IBC and Chart 1 in this guide).

What is ASTM E-119 (UL 263) and when is it required?

ASTM E-119 (UL 263) is a testing standard for walls that ensures an assembly can resist fuel loading through heat transfer. Fuel loading is when materials (ie. Boxes, wall paper, books) on one side of a wall are subjected to enough heat transfer from the opposite side of the wall that they ignite.

ASTM E119 (UL 263) approved products are required specifically when one or more openings in a Fire Barrier exceeds 25% of its total length. For these applications, you can use the Movable Fire Wall (MFW) rated at either 1 or 2 hours to match the adjacent wall.

If the size of your opening does not exceed the limitations noted under code sections, you may use the standard Fireguard using standard door rating for the appropriate separation per chart below

How Large of an opening can I protect with a Won-Door?

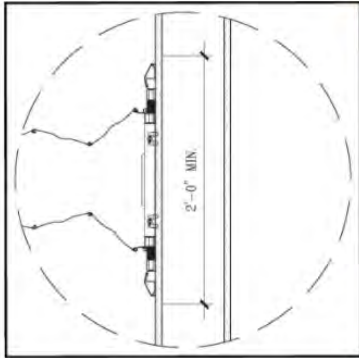
FireGuard doors may be up to 28' in height and the length is determined by a total size footage of 1400 sf. With special engineering, the doors can approach 40' in height.

The Movable Fire Wall has a maximum size of 40'x12'

How do I calculate the pocket depth?

See the calculator at <http://stackcalculator.wondoor.com/>

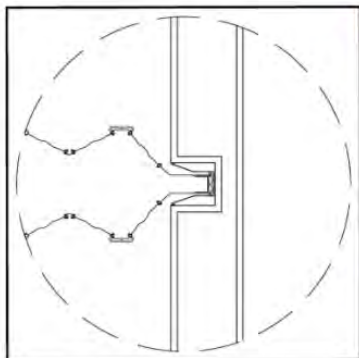
What jamb details are available?



FLAT LEAD POST

- STRAIGHT DOORS UP TO 40' X 12'
- INTEGRATED POCKET COVER DOOR INCLUDED
- FOR SINGLE PARTING DOORS ONLY
- 24" RATED SURFACE REQUIRED ON STRIKE WALL PERPENDICULAR TO DOOR

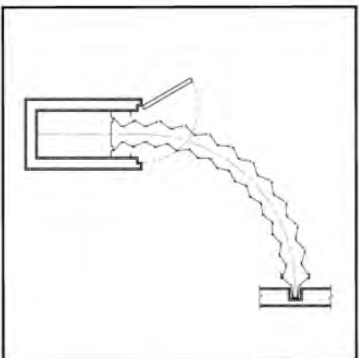
[Get Specifications](#) [Won-Door Sales Representative](#) [Find Out More & Stack Calculator](#)



NARROW LEAD POST

- U.L. LISTED FOR HEIGHTS UP TO 28' AND UNLIMITED WIDTHS
- CUSTOM HEIGHTS AVAILABLE
- POCKET COVER DOOR PROVIDED BY OTHERS
- FOR OPENINGS > 700 SQ. FT. PLEASE CONTACT YOUR LOCAL WON-DOOR SALES REP.

[Get Specifications](#) [Won-Door Sales Representative](#) [Find Out More & Stack Calculator](#)



CURVED

- STANDARD RADII ARE 5'-0" & 10'-0"
- CUSTOM RADII > 5'-0" AVAILABLE
- U.L. LISTED FOR HEIGHTS UP TO 28' AND UNLIMITED WIDTHS
- CUSTOM HEIGHTS AVAILABLE
- POCKET COVER DOOR PROVIDED BY OTHERS
- FOR OPENINGS > 700 SQ. FT. PLEASE CONTACT YOUR LOCAL WON-DOOR SALES REP.

[Get Specifications](#) [Won-Door Sales Representative](#) [Find Out More & Stack Calculator](#)

For additional information about detailing and code compliance, please visit <http://wondoors.com> or contact your local representative <http://wondoors.com/company-directory/>

Figure 3 – Full size chart
2015 IBC Chapter 7 – Fire and Smoke Protection Features

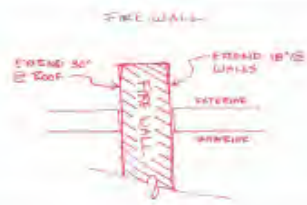
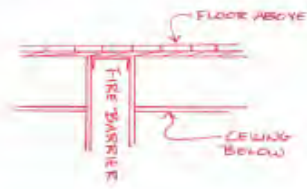
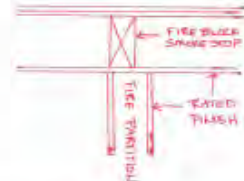
FIRE WALL vs. FIRE BARRIER vs. FIRE PARTITION			
	FIRE WALL, IBC 706 (INCL. PARTY WALL)	FIRE BARRIER, IBC 707	FIRE PARTITION, IBC 708
GRAPHICS			
CONSTRUCTION & CONTINUITY	Foundation through roof, exterior wall to exterior wall. Fire walls at roofs must extend 30" above adjacent construction. Fire walls at exterior walls shall extend not less than 18", with adjacent walls constructed of 1 hour rated materials. (Section 706.5, 706.6, 2015 IBC)	from top of foundation or floor/ceiling assembly below, to the underside of the floor/roof, slab/deck above. (Section 707.5, 2015 IBC)	from top of foundation or floor/ceiling assembly below, to the underside of the floor/roof, slab/deck above. OR to the fire resistance rated floor/ceiling assembly. Concealed spaces must be fireblocked or draftstopped (Section 708.4, 2015 IBC)
PROPERTIES	must maintain protection between separate building during fire, without collapse, even if they are attached to other structural elements that may collapse.	resist fire between spaces within a building for a required period of time	resist fire between spaces within a building for a required period of time
WHERE REQUIRED	Between 2 separate buildings that are connected.	Separating vertical and horizontal egress, shafts, mixed occupancies, exterior walls where required. Our E119 tested wall is applicable here if 25% or 156 sf needs to be exceeded. Our TR Wall is used for egress paths and stairways.	between adjacent residential occupancies, tenant spaces in mall buildings, corridor walls
OPENINGS (see table 716.5, 2015 IBC)		voids adjacent to barrier must be protected	openings are permitted with a minimum rating of 1 hour (Table 716.5, 2015 IBC)
	Non-Sprinklered - protected openings, up to 120 sf, width not to exceed 25% width of wall	Non-Sprinklered - protected openings, up to 156 sf, width not to exceed 25% width of wall (707.6, 2015 IBC)	
		Sprinklered - protected openings, may exceed 156 sf but width must still remain ≤/ < 25% width of wall (707.6, 2015 IBC)	
	Sprinklered - protected openings, may exceed 120 sf but width must still remain ≤/ < 25% width of wall	May exceed 156 sf and 25% width of wall if the opening is a fire door serving fire enclosures (707.6, 2015 IBC)	
		May exceed 156 sf and 25% width of wall if the opening has been tested in accordance with ASTM E119 or UL 263 and is rated equal or higher than the fire wall (707.6, 2015 IBC)	
	Party Walls - Fire Walls on lot lines may not have any openings. However, the lot line may not be considered if both properties are owned by the same entity and the wall is opened for the purpose of combined use.	May exceed 25% width of wall if the opening is part of a fire window assembly in an atrium separation wall. (707.6, 2015 IBC)	
RATINGS	2, 3, 4 hours	1, 2, 3, 4 hours	Fire Resistance > 1 hour (with exceptions noted in 708.3)

Figure 4 – Full size chart
Fire Code Requirements of Different Design Elements

	BASED ON 2015 IBC
Elevator Lobbies	Required in all buildings where 3 or more stories are connected by elevator, no sprinkler is present, groups I-1 I-2 I-3, or high rise more than 75' (3006.2). Lobby may be omitted if shaft is pressurized or smoke doors used at access point to elevator car (3006.3, exceptions 3 & 4)
Escalators	Require shaft enclosure as per 3004.2.1. If building has sprinkler system, you may use draft curtain or automatic shutters as per 712.1.3 - 712.1.3.2. Two (2) hour fire barrier is required for shafts penetrating 4 or more stories, and no less than 1 hour fire barrier for shafts penetrating less than 4 stories per section 713.4
Atriums	Atriums connect 2 or more floors (Chapter 2 Definitions). Atrium requirements noted below may be omitted by using emergency fire doors to turn an atrium into a shaft: - atrium spaces must be separated from adjacent spaces by a 1 hour fire barrier (404.6) - interior finishes of entire atrium must be no less than Class B (404.8) - no more than 200' travel distance (404.9.3) - use of mechanical smoke purge system (404.5) - full building sprinkler protection (404.3) - see also Exception 1
Stair Enclosures	Shaft Enclosure required if the stair is used as a means of egress per 1023.2. Two (2) hour fire barrier is required for shafts penetrating 4 or more stories, and no less than 1 hour fire barrier for shafts penetrating less than 4 stories per section 1023.2
Exit Enclosures (AKA Exit Passageways)	Required as needed to continue any protected egress path to the exterior via a fully protected passageway. Required to comply with section 1024.
Area Separations	Required between buildings as fire walls or between occupancies as fire barriers based on square footage or construction type as noted in Table 506.2
Double Egress Doors	Where egress or double egress is required see section 1010.1.4.3.
Temperature Rise Doors (Labeled "T" as per NFPA 252 or UL10B)	Required in non-sprinklered buildings in the exit stairs and exit passageways as per 716.5.5
ASTM E119 or UL263 Rated Openings (Labeled "W")	Required if more than 156sf or 25% of a fire barrier is utilized as an opening as per 707.6, exception 3.
Fire Service Access Elevator	Required where an occupied floor is more than 120' above FD vehicle access as per 403.6.1. Lobbies shall be enclosed 1 hour as per 3007.6.2 and the doors shall be tested without an artificail bottom seal as per NFPA 1784 - Section 3007.6.3
Occupant Evacuation Elevators	May be utilized as part of the evauation plan in compliance with section 3008. Lobbies shall be enclosed 1 hour as per 3008.6.1
This chart is for reference only and provided as a general guide to assist in finding the applicable sections of code. It is the responsibility of the designer to confirm local requirements and the applicability of code reference to their particular project.	