



ICC CODE CORNER 2012 IFC Code & Commentary

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SECTION 911 EXPLOSION CONTROL

911.1 General.

Explosion control shall be provided in the following locations:

1. Where a structure, room or space is occupied for purposes involving explosion hazards as identified in Table 911.1.
2. Where quantities of hazardous materials specified in Table 911.1 exceed the maximum allowable quantities in Table 5003.1.1(1).

Such areas shall be provided with explosion (deflagration) venting, explosion (deflagration) prevention systems, or barricades in accordance with this section and NFPA 69, or NFPA 495 as applicable.

Deflagration venting shall not be utilized as a means to protect buildings from detonation hazards.

- ◆ It is usually impractical to design a building to withstand the pressure created by an explosion. Therefore, this section requires an explosion relief system for structures, rooms or

spaces with occupancies involving explosion hazards. Explosions may result.

911.2 Required deflagration venting. Areas that are required to be provided with deflagration venting shall comply with the following:

1. Walls, ceilings and roofs exposing

TABLE 911.1
EXPLOSION CONTROL REQUIREMENTS

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
Hazard Category			
Combustible dusts ^a	—	Not required	Required
Cryogenic fluids	Flammable	Not required	Required
Explosives	Division 1.1	Required	Not required
	Division 1.2	Required	Not required
	Division 1.3	Not required	Required
	Division 1.4	Not required	Required
	Division 1.5	Required	Not required
	Division 1.6	Required	Not required
Flammable gas	Gaseous	Not required	Required
	Liquefied	Not required	Required
Flammable liquids	IA ^b	Not required	Required
	IB ^c	Not required	Required
Organic peroxides	Unclassified	Required	Not permitted
	detonable I	Required	Not permitted
Oxidizer liquids and solids	4	Required	Not permitted
Pyrophoric	Cases	Not required	Required
Unstable (reactive)	4	Required	Not permitted
	3 detonable	Required	Not permitted
	3 nondetonable	Not required	Required
Water-reactive liquids and solids	3	Not required	Required
	2 ^e	Not required	Required
Special Uses			
Acetylene generator rooms	—	Not required	Required
Grain processing	—	Not required	Required
Liquefied petroleum gas distribution facilities	—	Not required	Required
Where explosion hazards exist ^d	Detonation	Required	Not permitted
	Deflagration	Not required	Required

a. Combustible dusts that are generated during manufacturing or processing. See definition of Combustible Dust in Chapter 22.

b. Storage or use.

c. In open use or dispensing.

d. Rooms containing dispensing and use of hazardous materials when an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

e. A method of explosion control shall be provided when Class 2 water-reactive materials can form potentially explosive mixtures.



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surrounding areas shall be designed to resist a minimum internal pressure of 100 pounds per square foot (psf) (4788 Pa). The minimum internal design pressure shall not be less than five times the maximum internal relief pressure specified in Section 911.2, Item 5.

2. Deflagration venting shall be provided only in exterior walls and roofs.

Exception: Where sufficient exterior wall and roof venting cannot be provided because of inadequate exterior wall or roof area, deflagration venting shall be allowed by specially designed shafts vented to the exterior of the building.

3. Deflagration venting

shall be designed to prevent unacceptable structural damage. Where relieving a deflagration, vent closures shall not produce projectiles of sufficient velocity and mass to cause life threatening injuries to the occupants or other persons on the property or adjacent public ways.

4. The aggregate clear area of vents and venting devices shall be governed by the pressure resistance of the construction assemblies specified in Item 1 of this section and the maximum internal pressure allowed by Item 5 of this section.

5. Vents shall be designed to withstand loads in accordance

with the International Building Code. Vents shall consist of any one or any combination of the following to relieve at a maximum internal pressure of 20 pounds per square foot (958 Pa), but not less than the loads required by the International Building Code:

5.1. Exterior walls designed to release outward.

5.2. Hatch covers.

5.3. Outward swinging doors.

5.4. Roofs designed to uplift.

5.5. Venting devices listed for the purpose.

6. Vents designed to release from the exterior walls or roofs of the building when venting a deflagration



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shall discharge directly to the exterior of the building where an unoccupied space not less than 50 feet (15 240 mm) in width is provided between the exterior walls of the building and the lot line.

Exception: Vents complying with Item 7 of this section.

7. Vents designed to remain attached to the building when venting a deflagration shall be so located that the discharge opening shall not be less than 10 feet (3048 mm) vertically from window openings and exits in the building and 20 feet (6096 mm) horizontally from exits in the building, from window openings and exits in adjacent buildings on the same

lot, and from the lot line.

8. Discharge from vents shall not be into the interior of the building.

◆ This section prescribes the basic design criteria necessary for deflagration venting.

Deflagration venting limits the deflagration pressure in a certain area so that, in case of an explosion, the damage to that enclosed area is minimized or eliminated. Because there are so many variables involved for adequate deflagration venting, the parameters for each design should fit the individual situation. NFPA 68 contains additional guidance on the design and use of deflagration

venting systems.

The area of the vent must be adequate to relieve the pressure before it reaches a level in excess of what can be withstood by the weakest building member.

The vent area, therefore, is dependent on the actual construction of the enclosed area and the anticipated pressure. The vent panel should be of light-weight construction so that it can easily release at low pressures. Because the lightweight panels have little structural strength, railings may be required along the floor edge to prevent people or objects from falling against the panel.



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Item 5 indicates that the vents are to be designed to relieve at a maximum internal pressure of 20 pounds per square foot (psf) (958 Pa) but not less than the load design requirements in Chapter 16 of the IBC. In areas commonly subject to high winds, the release pressure has to be increased accordingly to prevent the vents from being actuated by wind forces. Even though the release pressure should be as low as practical, it must always be higher than the external wind pressure.

Venting devices must be located to discharge directly to the open air or to an unoccupied space at least 50 feet (15 240 mm) in width on the same lot. To

minimize damage and maintain the integrity of the existing system, window openings and egress facilities are not to be within 10 feet (3048 mm) vertically or 20 feet (6096 mm) horizontally of the vent. The spatial distance will permit the pressure to decrease and not to cause additional damage.

911.3 Explosion prevention systems. Explosion prevention systems shall be of an approved type and installed in accordance with the provisions of this code and NFPA 69.

◆ Depending on the conditions of the anticipated explosion hazard, the use of an explosion prevention system may be an

effective means of explosion control.

An explosion prevention system is most effective in confined spaces or enclosures in which combustible gases, mists or dusts are subject to deflagration in a gas-phase oxidant. Explosion prevention systems are intended to prevent an explosion hazard by combating the process of combustion at its incipient stage.

NFPA 69 contains further information on the installation, operation and design considerations for explosion prevention systems. Explosion prevention systems are commonly used to protect laboratory equipment, such as reactor vessels, mills



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and dust collectors.

911.4 Barricades.
Barricades shall be designed and installed in accordance with NFPA 495.

◆As indicated in Table 911.1, depending on the type of materials involved, barricade construction may be an acceptable method of

explosion control.

Barricade construction is an effective method of screening a building containing explosives from other buildings, magazines or public rights-of-way. The barricade could be either natural or artificial, where applicable, as specified in NFPA 495.

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The International Code Council, a membership association dedicated to building safety and fire prevention, develops the codes used to construct residential and commercial buildings, including homes and schools. Most U.S. cities, counties and states that adopt codes choose the International Codes developed by the International Code Council.



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