

## Ducts and Air-Transfer Openings

### IBC Sections 716.5 & 716.6

The following is a summary of the required locations, limitations, and ratings for fire and smoke dampers as of 9/1/11

Item	IBC Sec.	Fire Dampers IBC 716.5.1-6 SPS 362.0716		Smoke Dampers IBC 716.5.3, 716.5.4.1, 716.5.5, & SPS 362.0716		Radiation Dampers IBC 716.6.2
		Nonspr.	Spr.	Nonspr.	Spr.	
Incidental Uses (FB)	508.2.5 707.7	Yes (1)	Yes (1)	No	No	No
Separated Uses (FB)	508.4 707.7	Yes (1)	Yes (1)	No	No	No
Fire Wall (NOT a Party Wall)	706.8 706.11	Yes	Yes	No	No	No
Party Wall (FW)	706.1.1	Penetrations Not Allowed	Penetrations Not Allowed	Penetrations Not Allowed	Penetrations Not Allowed	--
Horizontal Exit (FW or FB)	706.8 & 707.6 707.3.4 1025.2	Yes	Yes	No	No	No
Vertical Exit Enclosure (FB)	707.3.2 1022.4 & 5	(2)	(2)	(2)	(2)	No
Exit Passageway (FB)	707.3.3 707.7.1 1022.4 & 1023.6	(2)	(2)	(2)	(2)	No
Smokeproof Enclosure (FB)	707.4 1022.9	(2)	(2)	(2)	(2)	No
FIRE RATED Corridors (FP)	709.1 & 9 1018.1 1018.4	Yes (4)	No (Unless defined by bldg designer)	Yes (6, 8)	Yes (6, 8)	No
Non-Fire Rated Corridors	1018.1 & .4	No	No	No	No	No
Shaft Enclosure	708.4 & .10 716.5.3 SPS 362.0716(1)	Yes (7)	Yes (7)	Yes (8) Exception (12)	Yes (8) Exception (12)	No
Smoke Barrier (SB)	710.8 716.5.5 SPS 362.0716	No	No	Yes (8, 9)	Yes (8, 9)	No
Exterior Wall	705.14	No	No	No	No	No
R-1/R-2 Unit Separation (FP- Vertically, Horizontal Assys)	709.1 & .9 712.3 716.5.4	Yes (Vertically)(4)	No (Vert)(3) May (Horiz) (As an Alternative to the required radiation damper or if penetrating through roof/ceiling or floor ceiling)	No	No	Yes (10)
Mall Tenant Separation (FP)	402.7.2, 709.1 & .9 716.5.4	Yes (4 & 5)	No (5)	No	No	No
Atrium Enclosure (FB)	404.6 707.7 716.5.2	Yes (1)(5)	Yes (1)(5)	(5)	(5)	Yes (5)
Elevator Lobby (FP)	708.14.1, 709.1	Yes (4)	No	No	No	No
Underground Buildings	405.4.2 716.5.5	(5)	(5)	(5, 8)	(5, 8)	No
Windowless Buildings	408.9	(5)	(5)	(5, 8)	(5, 8)	No
Through Penetrations in Req'd Fire Rated Floor/Ceiling Assy Connecting NOT MORE THAN	716.6.1	Yes (@ floor line, with no shaft	Yes (@ floor line, with no shaft	No (If no shaft is installed)	No (If no shaft is installed)	No

2 STORIES (ANY Occupancy EXCEPT I-2 & I-3)		requirement)	requirement)			
Through Penetrations in Req'd Fire Rated Floor/Ceiling Assy Connecting NOT MORE THAN 3 STORIES (ONLY R Occupancies)	716.6.1	Yes (@ Floor Line, with no shaft req'd) (13)	Yes (@ Floor Line, with no shaft req'd) (13)	No (If no shaft is installed)	No (If no shaft is installed)	Yes (13)
Membrane Penetrations in Required Fire Rated Floor/Ceiling & Ceiling/Roof Assemblies (FB) (See also "Corridors" if applicable)	Table 601 709.4 712.3	Yes (As an Alternative to the required radiation damper)	Yes (As an Alternative to the required radiation damper)	No	No	Yes (10)
Through Penetrations in NON-fire resistance-rated assemblies	716.6.3	Yes (11)	Yes (11)	No	No	No

"FW" means Fire Wall. "FB" means Fire Barrier. "FP" means Fire Partition. "SB" means Smoke Barrier. See also Section IBC 716.5 for additional provisions. The most significant are:

1. Fire dampers are not required in ducted HVAC systems provided the wall is 1-hour fire resistance rated or less, occupancy is not Group H, and the building is equipped throughout with an automatic sprinkler system. (IBC Section 716.5.2, Exc. 3). A ducted HVAC system shall be duct system for conveying supply, return or exhaust air as part of the structure's HVAC system. The duct system shall be constructed of continuous sheet steel not less than 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.
2. Duct penetrations are generally prohibited. (IBC Sections 909.20.2, 1022.5 & 1023.6)
3. Fire dampers are not required in tenant separation and corridor walls in buildings equipped throughout with an automatic sprinkler system in accordance with NFPA 13 & NFPA 13R and the duct is protected as through penetration in accordance with Section 713. Applicable to all occupancies except Group H. (IBC Section 716.5.4, Exc. 1)
4. Fire dampers are not required provided the duct penetrates a wall, the does not exceed 100 sq inches, duct is constructed of steel w/min. of 0.0217 (24 ga) inch in thickness, duct openings do not communicate with adjacent spaces or rooms, duct is installed above a ceiling, duct does not terminate at a wall register in the fire resistance rated wall, and duct is a min. of 12-inch-long by 0.060 thick (15 ga) steel sleeve centered in each duct secured to both sides of wall and all 4 sides of sleeve with min. 1-1/2" x 1-1/2" by 0.060 (15 ga) steel retaining angles. Retaining angles to be secured to sleeve and wall with #10 screws. The annular space between the steel sleeve and the wall openings to be filled with mineral wool batting on all sides. Applicable to all occupancies except Group H. (IBC Section 716.5.4, Exc. 3)
5. Smoke control system is required. (IBC Sections 402.10, 404.5, & 405.5 [Note IBC 909.2 may exempt fire/smoke/radiation dampers in order to facilitate smoke control system])
6. Smoke dampers are not required, provided duct is minimum No. 28 gage galvanized steel and has no openings serving the corridor. (IBC Section 716.5.4.1, Exc. 2)
7. Fire dampers are not required in shaft enclosures if IBC Section 716.5.3.1 or SPS 362.0716(1) is met.
8. Smoke dampers shall be activated using a smoke detection system defined in IBC 716.3.3.2, or meet an exception listed.
9. Smoke dampers are not required where 1) the openings in ducts are limited to a single smoke compartment and the ducts are constructed of steel; OR 2) in Group I-2 (hospitals/nursing homes) duct penetrations of smoke barriers in fully ducted HVAC systems (SPS 362.0716(2))
10. Ceiling radiation dampers are exempted from installation in membrane penetrations of a fire rated floor/ceiling or roof/ceiling system (typically required via IBC 420, Table 601 & 712.3) for exhaust ventilation systems that will not recirculate (ie. toilet exhausts, kitchen exhausts, etc.), are located with the cavity of a wall, and do not pass through another dwelling unit or tenant space. Per IFGC 202 a "Vent" is a pipe or

other conduit composed of factory-made components, containing a passageway for conveying combustion products and air to the atmosphere, listed and labeled for use with a specific type or class of appliance.

**NOTE: An exhaust duct/system is NOT a vent.** (IBC 716.6.2.1)

11. Duct systems that penetrate non fire resistance-rated floor assemblies and that connect not more than 2 stories are permitted without shaft enclosure protection provided that the annular space between the assembly and the penetrating duct is filled with an approved noncombustible material to resist the free passage of flame and the products of combustion. Duct systems that penetrate non fire-resistance rated floor assemblies and that connect not more than three (3) stories are permitted without shaft enclosure protection provided that the annular space between the assembly and the penetrating duct is filled with an approved noncombustible material to resist the free passage of flame and the products of combustion, and a fire damper is installed at each floor line—Exception fire dampers are NOT required in ducts within individual residential dwelling units. (IBC 716.6.3)
12. The following do not require smoke dampers on shaft penetrations: 1.1. Steel exhaust subducts extended at least 22" vertically in exhaust shaft provided w/continuous airflow upward to outside; 1.2. Penetrations are tested per ASTM E119 or UL 263 as part of fire resistance rated assembly; 1.3. Ducts are part of approved smoke control system where the fire damper will interfere with the operation of the smoke control system; 4. In fire smoke control system if smoke dampers will interfere with operation; 1.4. Parking garages w/supply or exhaust shafts separated from other building shafts by  $\geq 2$  hr fire rated construction; 2. Group "B" occupancies w/NFPA 13 sprinkler system in shafts where kitchen, clothes dryer, bathroom & toilet room exhaust openings have steel exhaust openings w/0.0187 (26 ga) steel that extend  $\geq 22$ " vertically and the exhaust fan is powered continuously in accordance with IBC 909.11 to the outside.
13. The duct shall meet the following: 1. Be contained/located within the cavity of the wall (or floor assembly), & must have steel  $\geq 0.019$  (26 ga); 2. Duct to open into ONLY 1 dwelling or sleeping unit & the duct is to be continuous to the exterior of to the building; 3. May not exceed 4" diam. & total area not to exceed 10 sq. in. for 100 sf of floor area; 4. Annular space around shall be protected; and 5. Grille openings located in a fire rated floor ceiling or roof ceiling assembly to be protected with a **ceiling radiation damper** per IBC 716.6.2.1

12/09 RRD