

Detection zones shall be arranged to provide a single initiation signal for each smoke control zone. A detection zone shall not protect more than one smoke control zone.

Where flow switches are used to initiate smoke control systems, time delays shall be used to prevent momentary activation of the flow switch from initiation of the incorrect smoke control zone. (See [Clause 3.12.](#))

NOTE The time delay may be set in the range of 45 s to 60 s but should be verified at the time of commissioning.

Table 7.4 — Initiation of smoke control systems

System (as defined by AS 1668.1)	Measures		
	Smoke detection in accordance with this Standard	Sprinklers where installed	MCP where installed to initiate a general fire alarm condition
Miscellaneous systems	Required	Required	Supplementary
Shutdown systems	Required	Required	Required
Zone pressurization systems	Required	See Note 1	Shall not be used (Note 2)
Hot layer smoke control systems	Required	See Note 1	Shall not be used (Note 2)
Fire-isolated exit pressurization systems	Required	Required	Required
Air purge systems	Required	Required	Required
Lift shaft pressurization systems	Required	Required	Required
NOTE 1 Fire sprinkler systems shall not initiate zone pressurization systems or zoned hot layer smoke control systems unless the sprinkler system is zoned identically to the smoke control zone initiating the smoke control system.			
NOTE 2 MCPs shall not initiate zone pressurization systems or zoned hot layer smoke control systems.			

C7.4 Where fire sprinklers inadvertently activate zone pressurization systems outside of the area affected by the fire event, the smoke control system may act to spread smoke throughout the building and not contain or restrict it. The proper operation of zone pressurization systems relies on accurate identification of the fire location and reliable interfaces.

The use of manual call points is not appropriate to initiate zone pressurization systems and zoned hot layer smoke control systems as this may cause smoke control systems to operate in a different zone to that of the fire-affected smoke control zone due to activation of the manual call point from another part of the building as a means of raising a fire alarm. Fire sprinkler systems should be designed to only serve within the bounding perimeters of smoke or fire compartments, or have other means of determining a specific compartment where applicable for smoke control activation. Liaison is necessary during design to ensure that smoke control systems and their zoning are understood for FDCIE alarm response.

Smoke detection systems are required to provide timely operation of the smoke control system before the fire has developed to sufficient intensity to operate a heat detector or sprinkler system. The early detection of smoke is considered an essential element of the smoke control system.

7.4.2 Other fire safety systems and system control

Activation of fire sprinkler systems and MCPs shall only initiate common building smoke control systems such as system shutdown, air purge (for legacy systems), lift shaft pressurization and fire-isolated exit pressurization.

Fire sprinkler systems shall only initiate zone pressurization systems and zoned hot layer smoke exhaust systems where the sprinkler system is either serving that smoke control zone as an individual

system or alternatively has specific zoning associated with and serves the smoke control zone (e.g. flow switch initiation for a sprinkler area that is identical to the smoke control zone for that area).

MCPs shall not initiate zone pressurization systems (zoned smoke control systems) or zoned hot layer smoke control systems.

7.5 Automatic smoke detection for system control

7.5.1 General

The following requirements shall apply:

- (a) Automatic smoke detectors shall be connected to FDCIE.
- (b) Smoke detectors shall be —
 - (i) photoelectric point-type;
 - (ii) photoelectric smoke detection equipment for ducts;
 - (iii) photoelectric aspirating smoke detector (ASD); or
 - (iv) optical beam smoke detectors which respond to light obscuration.

Detection of smoke in a duct or chamber shall be accomplished with duct sampling equipment or aspirated smoke detection.
- (c) Detectors shall be spaced not more than 15 m apart and not more than 7.5 m from —
 - (i) any wall, bulkhead or curtain within the circulation space;
 - (ii) the perimeter of the circulation space in car parks.
- (d) Optical beam smoke detectors shall be spaced in accordance with [Clause 5.1.2](#).
- (e) Detector sensitivity shall meet the general requirements of the applicable component Standard.
- (f) Detection of smoke in a duct or air handling plenum shall be accomplished with duct sampling smoke detectors or ASD. Where ASD is used it shall have a minimum of two sampling points per sampled area.
- (g) Where AVF or similar delays are used, the delay shall not exceed 60 s.
- (h) AVF shall not be applied to supply air and outdoor air smoke detection.

NOTE For areas where contaminants such as theatrical smoke may be present smoke detectors combining photoelectric and carbon monoxide sensing may reduce nuisance alarms.

7.5.2 Detector location

7.5.2.1 General

Smoke detectors and ASD sampling points shall be ceiling-mounted in accordance with this Standard and arranged at natural collection points for hot smoke having due regard to the ceiling geometry and its effect on smoke migratory paths via circulation spaces.

Where optical beam smoke detectors are provided they shall be installed in accordance with this Standard.

Where tenancy fit-outs using floor to ceiling height partitions occur, smoke detectors shall be located to cover all circulation spaces formed by the tenancy fit out.

7.5.2.2 Detection in circulation spaces

Smoke detection shall be provided in circulation spaces to automatically initiate the following:

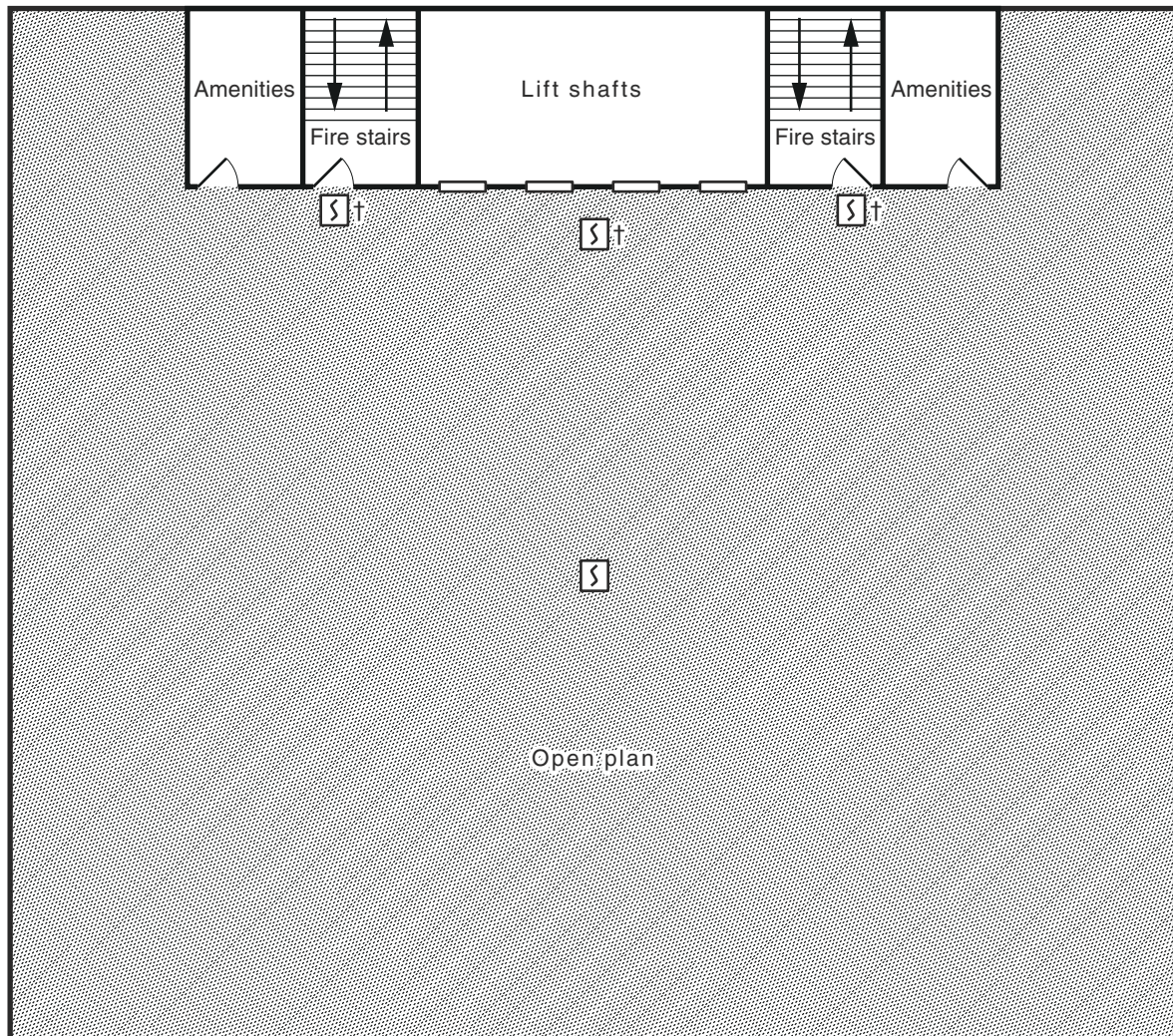
- (a) Car park ventilation systems.
- (b) System shutdown.
- (c) Zone pressurization.
- (d) Fire isolated exit pressurization.
- (e) Lift shaft pressurization.

NOTE 1 For examples of circulation spaces, see [Figures 7.5.2.2\(A\) to 7.5.2.2\(C\)](#). Detector locations are only indicative.




NOTE 2 Heat detectors do not meet this requirement.

Smoke detection need not be provided in rooms that open directly into circulation spaces, except for the following:

- (i) Rooms that have a dimension of 15 m or more in any direction on the horizontal plane shall have detection provided in the room in accordance with [Clause 7.5](#). Detection is not required in any area not used by occupants for an extended period of time such as a storeroom with a floor area less than 30m², a sanitary compartment, plant room or the like.
- (ii) Rooms that open directly into fire-isolated pressurized exit paths shall have detection provided in the room in accordance with this section.

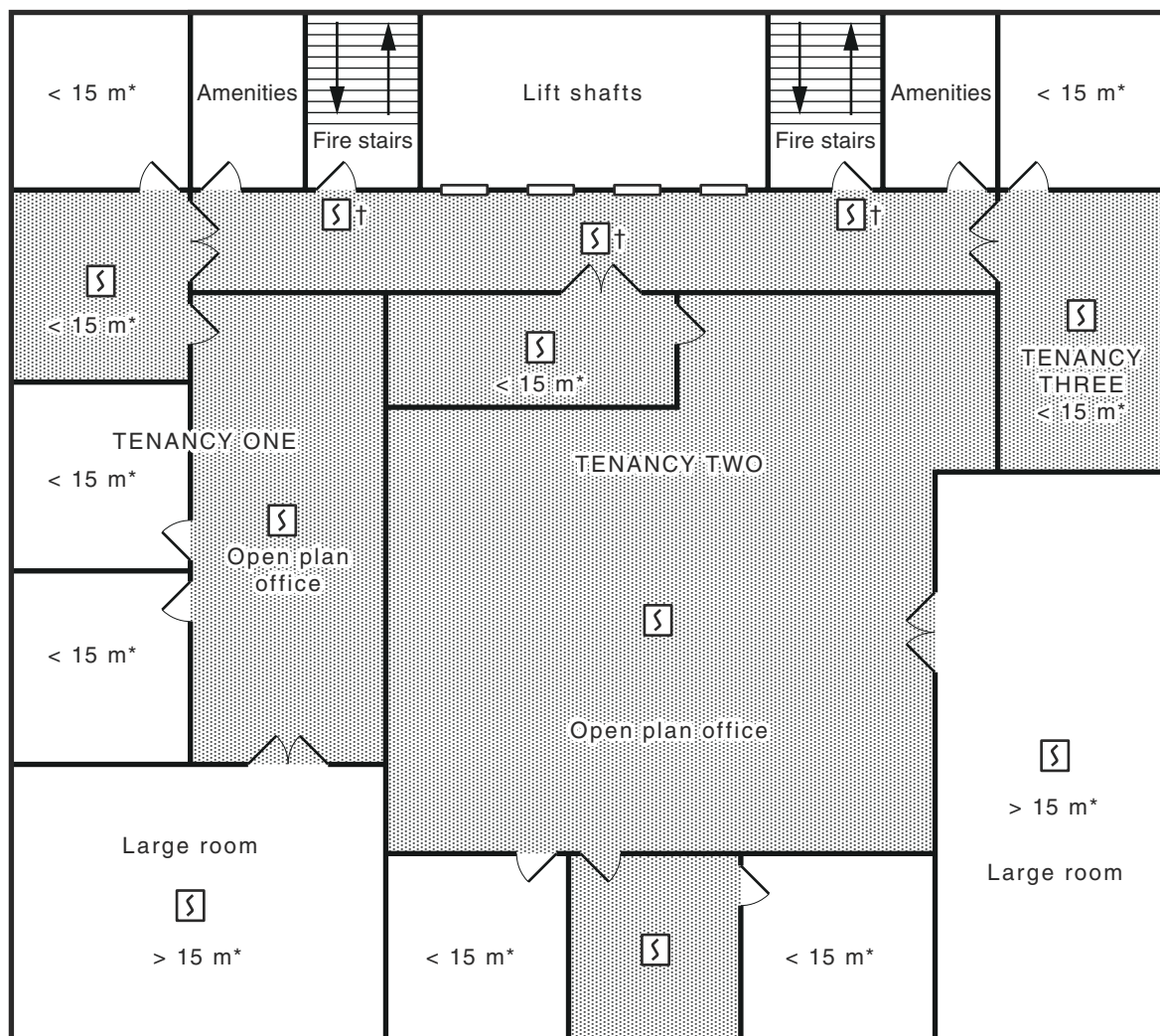


LEGEND:



-  Circulation space
-  Smoke detector(s)
-  See Note

NOTE See [Clause 7.5.4](#).

Figure 7.5.2.2(A) — Indicative detector locations example — Open plan floor — No fitout



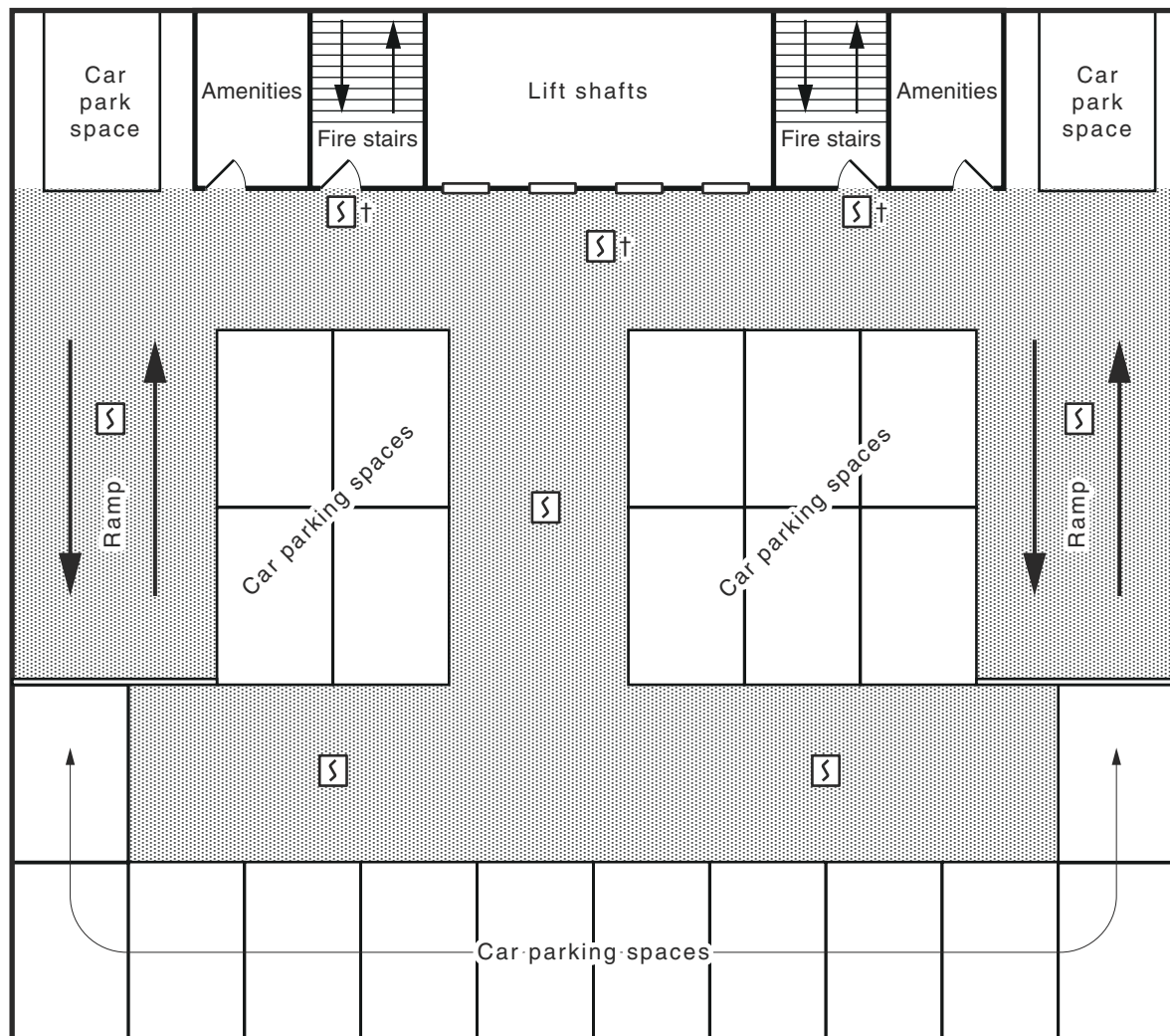
LEGEND:

-  Circulation space
-  Smoke detector(s)
- * See Note 1
- † See Note 2




NOTE 1 See [Clause 7.5.2.2](#).

NOTE 2 See [Clause 7.5.4](#).

Figure 7.5.2.2(B) — Indicative detector locations example — Multiple tenant floor layout



LEGEND:

-  Circulation space
-  Smoke detector(s)
-  † See Note

NOTE See [Clause 7.5.4](#).

Figure 7.5.2.2(C) — Indicative detector locations example — Car park

7.5.2.3 Detection in hot layer smoke control systems

Smoke detection provided to automatically initiate hot layer smoke control systems shall be located throughout the smoke control zone served by the hot layer smoke reservoir.

7.5.3 Relative sensitivity of detectors

In zoned pressurization systems and zoned hot layer smoke exhaust systems where there is a possibility of smoke migration to adjacent areas, all protected space smoke detectors shall be set to sensitivities such that any difference will not adversely affect the operation of the system.

C7.5.3 A mix of detector sensitivities (including point/multi-point type) in different smoke control zones could result in the air-handling plant serving a non-fire-affected smoke control zone, operating as if it

(continued)

was the fire-affected smoke control zone. Where in-duct or air-handling plant enclosure smoke detection is installed (as compared to the circulation space) a mix in detector sensitivity is not considered to be a problem as shutdown of the air-handling plant will still occur even though full building fire mode has not been initiated.

7.5.4 Location of detectors at doors to pressurized exits and lift landing doors

Where an exit pressurization or zone pressurization system is installed the following shall apply:

- (a) A smoke detector shall be located in the circulation space adjacent to each required exit door, so that the horizontal distance of the smoke detector from the door opening is not less than 0.3 m or not greater than 1.5 m.

Where the exit door is at the end of a circulation space formed by floor to ceiling height partitions and there is no other door within 1.5 m of the exit door, the smoke detector spacing shall be not less 1.5 m and not more than 3 m as shown in [Figure 7.5.4\(A\)](#) and [Figure 7.5.4\(B\)](#).

- (b) Lift landing areas shall be protected by smoke detector(s). Detectors shall be located so that the horizontal distance is not less than 1.5 m and not more than 3 m from any lift door.
- (c) Where a fire-isolated exit pressurization system is installed in accordance with AS 1668.1, smoke detectors need not be installed within the pressurized exit path.

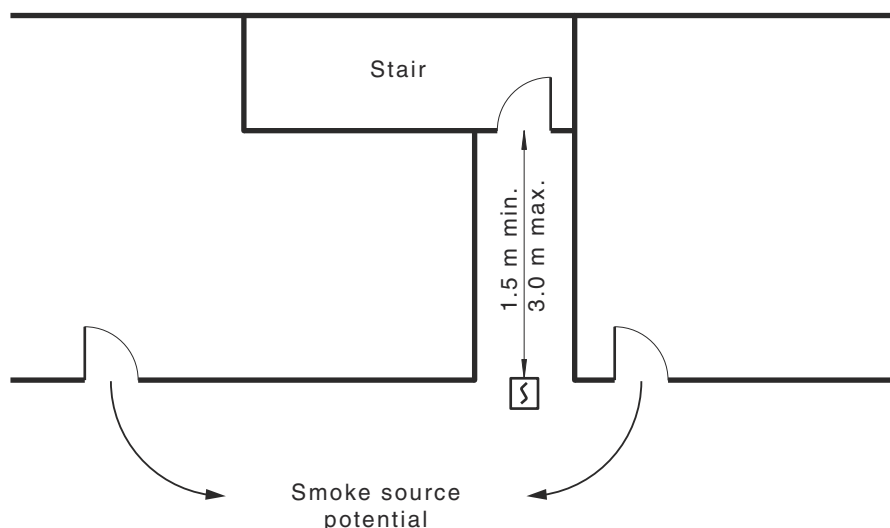


Figure 7.5.4(A) — Detector locations — Exits

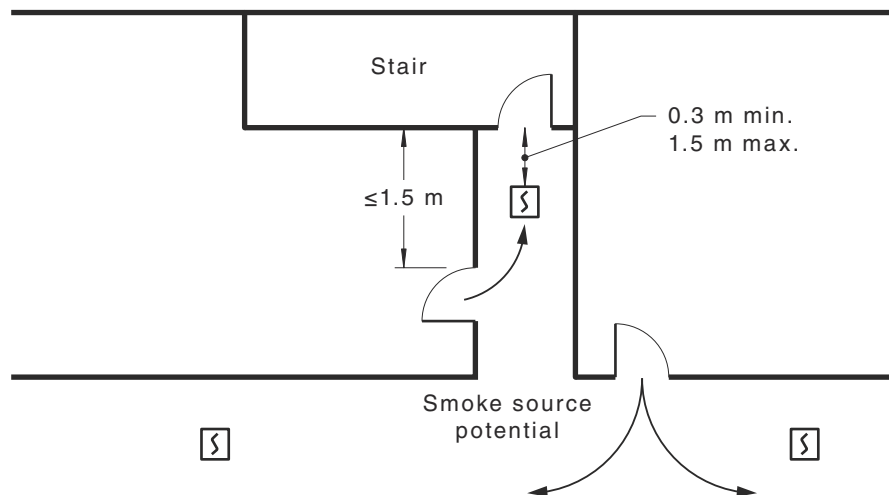


Figure 7.5.4(B) — Detector locations-exits

7.6 Miscellaneous systems

7.6.1 Scope

This section sets out the requirements for miscellaneous air-handling systems that do not form part of a smoke control system.

7.6.2 General

When fire mode is initiated, air-handling systems not designed to operate in fire mode shall shutdown in accordance with this section.

7.6.3 Special purpose systems

Special purpose air-handling systems, such as those serving computers, operating theatres and refrigerated plant rooms, need not shutdown.

7.6.4 Single enclosures

Air-handling system(s) serving a single enclosure not required to be shutdown shall be provided with supply air detection where required by the mechanical design.

C7.6.4 *The intent of an exemption for single enclosures is to simplify the installation of systems, while preventing the spread of smoke to principle evacuation paths.*

7.6.5 Exhaust systems

7.6.5.1 Minor exhaust systems

Minor exhaust systems protected with fire dampers are not required to shut down in the fire mode. Minor exhaust systems protected with subducts shall operate in fire mode.

7.6.5.2 Major exhaust systems

Where a major exhaust system does not form part of a smoke control system, they are considered to unduly contribute to the spread of smoke and shall be treated as a central

air-handling system in accordance with AS 1668.1 or be a system incorporating shut down in accordance with AS 1668.1.

C7.6.5.2 Major exhaust systems cover those systems not classified as minor. In most instances it is likely that these systems will be designed for smoke control. Where not so designed, they have the capacity to allow an unacceptable quantity of smoke to spread between compartments, and smoke dampers are, therefore, required to maintain the integrity of compartmentalization and close off the openings on detection of smoke.

7.6.6 Supply air systems

7.6.6.1 Minor supply air systems

Minor supply-air systems are not considered to unduly contribute to the spread of smoke and are not required to shut down in fire mode.

Where a system operates in the event of fire, supply air detection shall be provided in accordance with this section ([Clause 7](#)).

C7.6.6.1 Where a system is designed to shut down in fire mode, supply air smoke detectors are not required. If the system is allowed to operate in fire mode, then supply air smoke detectors are required.

7.6.6.2 Major supply air systems

Major supply systems are considered to unduly contribute to the spread of smoke and shall be treated as part of a smoke control system(s) incorporating shutdown.

C7.6.6.2 In most instances major supply air systems will be designed for smoke control. Where not so designed, they have the capacity to allow an unacceptable quantity of smoke to spread between compartments and smoke dampers are therefore required to maintain the integrity of compartmentalization and close off the smoke leakage path.

7.6.7 Exhaust duct heat detectors

Exhaust duct detection shall be in accordance with [Clause 3.27.3\(c\)](#).

7.6.8 Car park ventilation systems

7.6.8.1 General

Car parks and loading docks where ventilation systems are installed in accordance with AS 1668.2 and are served by lifts or fire isolated pressurized exit paths shall have smoke detection in circulation spaces and at each required exit and lift landing door in accordance with this section.

7.6.8.2 Override control

To enable manual control, fans that are not required to shut down on initiation of fire mode in the car park shall be provided with control switches and indicators at the designated building entry point. Signage should be located at the car park entry indicating the location of the control switches.

Each control switch and indication shall form part of an FFCP, with operating and maintenance instructions provided in accordance with this section. Indication is not required for switches controlling additional air-moving devices installed in accordance with AS 1668.2 (such as a jet fan).

Where an additional air-moving device installed in accordance with AS 1668.2 is a fan (such as a jet fan), a separate switch shall be provided to enable restart and manual control. Where more than one

fan is utilized in a fire compartment, they shall be controlled by a common switch. Where there are multiple fire compartments, a switch shall be provided for each fire compartment.

All control switches and accompanying indications shall be provided in accordance with this section.

7.6.8.3 Supply air smoke detectors

Supply air smoke detection shall be provided in accordance with this section.

7.6.8.4 Operation in fire mode

Where automatic fire detection or suppression is provided in the car park, activation of any of these systems shall cause the ventilation system to operate at full ventilation rate.

Supply air systems shall shut down upon the detection of smoke in the supply air. Supply air systems shall restart on clearance of the smoke from the detector in accordance with the requirements of this Standard.

Where an additional air-moving device installed in accordance with AS 1668.2 is a fan (such as a jet fan), such fans shall shutdown when any of the following occurs:

- (a) On initiation of fire mode.
- (b) Activation of a sprinkler system in the car park.
- (c) Activation of the jet fan smoke detection system.

7.6.8.5 Jet fan smoke detection

Jet fans shall be provided with Class A ASD smoke detection in the area of air jet influence.

NOTE The location of the ASD sampling point should be in accordance with its installation instructions for jet fan applications.

7.7 Supply air systems

Where air handling equipment is used to provide supply air, makeup air or outside air in fire mode, the following is required:

- (a) A smoke detector shall be located downstream of the air filter and supply air fan of each air-handling plant and upstream of the first branch take-off or, where this is not possible, either within the outdoor/return air mixing chamber upstream of the supply air fan, or within each supply air duct emanating from the air handling plant. See [Figure 7.7](#).
- (b) Each detector mounted in an air-handling system shall indicate as a separate detection zone.
- (c) Duct sampling smoke detectors shall be used for monitoring air in ducts.
- (d) Duct sampling probes shall be installed as specified in [Clause 3.27.3](#).
- (e) Detectors installed in air-handling systems shall be provided with permanent indelible labels, stating detection zone designation, detector ID and air handling equipment identifiers affixed adjacent to the detectors.
- (f) The supply air smoke detector alarm condition shall be indicated on the FFCP by either —
 - (i) flashing the red “fan running” indicator; or
 - (ii) flashing a separate dedicated red indicator grouped with the related fan indicators.

The function of the indicator shall be clearly labelled or described in the operating instructions.