ACT Government

ACT FIRE & RESCUE

SMOKE DETECTION IN CARPARKS

FIRE SAFETY GUIDELINE FSG-27

JUSTICE AND COMMUNITY SAFETY DIRECTORATE
EMERGENCY SERVICES AGENCY
ACT FIRE AND RESCUE

DECEMBER 2025 VERSION 1.0

Contents

GLOSSARY OF TERMS

Acronym / Term	Definition
ACTF&R	ACT Fire & Rescue.
NCC	National Construction Code.
AS1668.1:2015	The use of ventilation and air-conditioning in buildings, Part-1: Fire and Smoke control in buildings
AS1668.2:2012	The use of ventilation and air-conditioning in buildings, Part-2: Mechanical ventilation in buildings
AS1670.1:2018	Fire detection, warning, control and intercom systems – System design, installation and commissioning, Part-1: Fire
Fire Brigade Intervention	Actions undertaken by the attending fire brigade for the purpose of protecting life and property within the building.
EVSHR	Electric Vehicle Special Hazard Report
Circulation space	Areas within a building that are used for pedestrian travel including designated paths of travel leading to exits from car spaces in car parks, and other paths of travel to exits.

FOREWORD

Using smoke detection systems is a critical aspect of life safety in buildings under the NCC. This guideline clarifies where smoke detection is required, including considerations for pressurised exits, enclosed carparks, and circulation spaces. It supports compliance with NCC Vol. 1 and applicable Australian Standards such as AS 1670.1, AS 1668.1, and AS 1668.2.

PURPOSE

To provide guidance to certifiers, fire engineers, and designers on the appropriate application and placement of smoke detection systems in circulation areas and serving pressurised exits, within carparks. This includes clarifying when detection is required under the NCC and referenced Australian standards.

GENERAL REQUIREMENTS

Smoke detection systems in carparks are required where specified by:

- NCC Volume 1, Clause E2D12 and Specification 20
- AS 1670.1-2018, Fire detection, warning, control and intercom systems – System design, installation and commissioning, Part 1: Fire
- AS 1668.1-2015, The use of ventilation and air conditioning in buildings, Part 1: Fire and smoke control in buildings
- AS 1668.2-2012, The use of ventilation and air conditioning in buildings, Part 2 Mechanical ventilation in buildings

SMOKE DETECTION IN CIRCULATION SPACES

Detection is required in circulation spaces where:

- The space is enclosed and forms part of a path of travel (e.g. lobbies, corridors).
- Detection is required to initiate occupant warning or smoke control systems.
- Interconnection with alarm systems in Class 2-9 buildings is necessary (per NCC Vol 1 Part E2 and Spec 20).

Detection is not required in:

- External/open-air spaces with no interconnection to other fire systems or mechanical ventilation systems
- Enclosed spaces that are not considered circulation space and not served by smoke control systems

PRESSURISED EXITS AND LIFT SHAFTS

Where a stairwell or lift shaft servicing the carpark is required to be pressurised:

- To activate pressurisation systems, smoke detection must be installed in adjacent areas (e.g. lobbies).
- Detection is essential to comply with AS 1668.1 clauses 4.3.5 and 5.3.
- This detection is in addition to detection required in circulation spaces.

These systems must:

- Trigger automatically upon smoke detection.
- Interface with the building management/fire indicator panel.

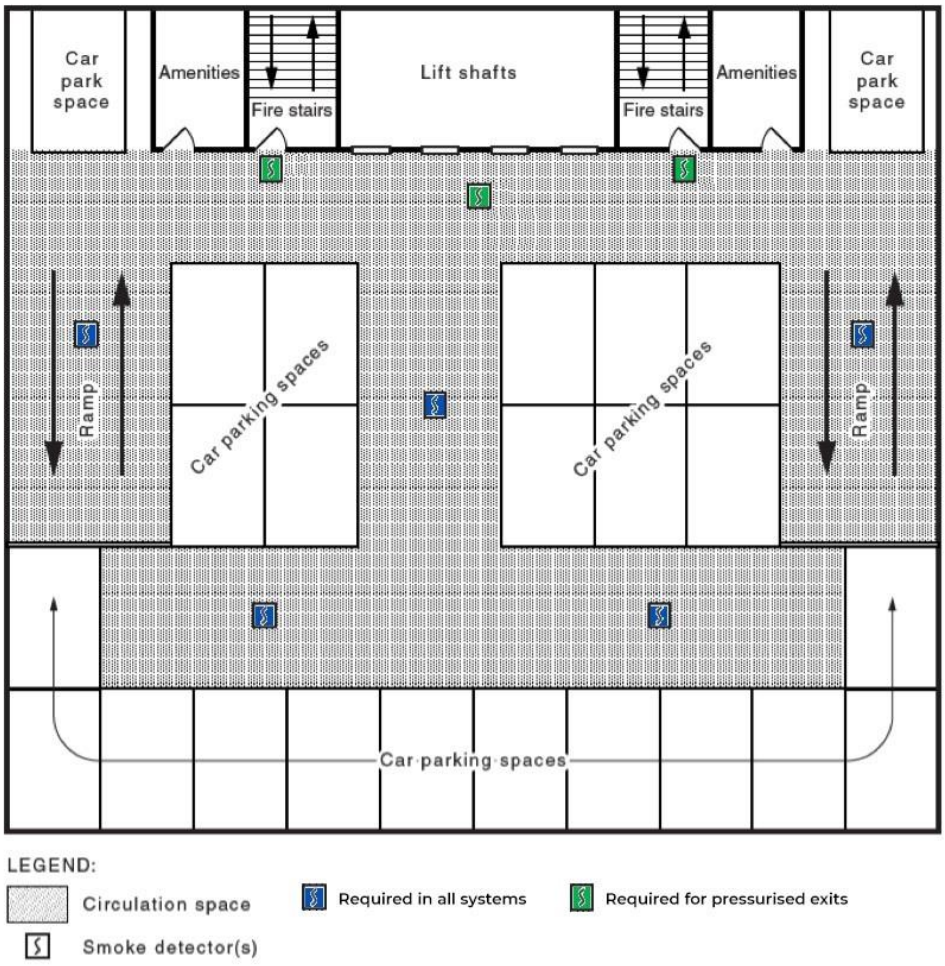

Figure 1. Required Smoke Detector Locations

PERFORMANCE SOLUTIONS AND SPECIAL HAZARD REPORTS

Consideration of system design exceeding that of a required smoke detection and alarm system should be assessed for any performance solutions proposed for carpark areas, including:

- Carpark travel distances
- Omission of required Stair Pressurisation to Basement Levels
- Internal Discharge of Fire Stairs
- Separation of Rising & Descending Stairs
- Provisions/location for End-of-Trip facilities

For any new building/project containing a carpark (Class 7a building or part of a building) ACTF&R will require the completion of a risk assessment in the form of a 'Special Hazard Report' to be submitted to ACTF&R as part of the existing Building Approval process. Section 19 Building Regulation, 2008 (ACT). This does not apply to a class 1 building that contains a garage.

The Special Hazard Report is to identify the risks associated with the presence or potential presence of EVs and/or EV Charging facilities within the subject building and determine the required safety measures to mitigate these risks so far as is reasonably practicable (SFAIRP)

NCC & AUSTRALIAN STANDARD REFERENCES

REFERENCE	RELEVANT CLAUSES
NCC 2022 Vol 1 – E2D12	• A Class 7a building, including a basement, provided with a mechanical ventilation system in accordance with AS 1668.2, must comply with clause 5.5 of AS 1668.1
AS 1668.1-2015, 5.5 CARPARK VENTILATION SYSTEMS	• **5.5.1 General** Mechanical carpark ventilation systems shall conform with Clause 4.6 and Clauses 5.5.2 to 5.5.6. • **5.5.4 Smoke detectors** Supply air smoke detection shall be provided in accordance with the smoke control requirements of AS 1670.1 • **5.5.5 Operation in fire mode** Where automatic fire detection or suppression is provided in the carpark, activation of this system shall cause the ventilation system to operate at full ventilation rate. • **1.4.12 Circulation space** Area within a building that is used for pedestrian travel, which is a passageway, corridor, hallway, stairway, lobby, atrium, enclosed walkway and mall, shop, area in a room that leads to another room, path of travel in a carpark and loading dock that leads to an exit or other path of travel to an exit.
AS 1670.1-2018, Fire detection, warning, control and intercom systems – System design, installation and commissioning	• **Section 7 – Smoke control systems** • **7.4.1 Automatic initiation of smoke control systems** Smoke control systems shall be automatically initiated by smoke detectors in accordance with this Standard. • **7.5 Automatic smoke detection for system control** • **7.5.2.2 Detection in circulation spaces** Smoke detection shall be provided in circulation spaces to automatically initiate the following: (a) Carpark ventilation systems

(b) System shutdown

(c) Zone pressurisation

(d) Fire isolated exit pressurisation

(e) Lift shaft pressurisation

- **7.6.8.1 Carpark ventilation system – General**

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

NCC 2022 Vol 1 – Specification 20 Smoke detection and alarm systems	• **S20C2 Type of system** A required automatic smoke detection and alarm system must be provided in accordance with the following: (c) Class 5. 6. 7. 8. 9b and 9c buildings – a smoke detection system complying with S20C4 • **S20C4 Smoke detection system** (2) (a) (ii) In a class 2 or 3 building provided with a smoke detection system, smoke detectors must be installed, subject to (b), in public corridors and other internal public spaces. (2) (b) In a class 2 or 3 building provided with a sprinkler system complying with Spec 17 (other than a FPAA101D or FPAA101H system), smoke detectors are not required in public corridors and other internal public spaces. • **S20C6 Smoke detection for smoke control systems** (1) Smoke detectors *required* to activate air pressurisation systems for fire-isolated *exits* and zone pressurisation systems must— (a) be installed in accordance with AS 1670.1; and (b) have additional smoke detectors installed adjacent to each bank of lift landing doors set back horizontally from the door openings by a distance of not more than 3 m.

(2) Smoke detectors *required* to activate—

(a) *automatic* shutdown of air-handling systems in accordance with E2D16, E2D17 or E2D19; or

(b) a smoke exhaust system in accordance with Specification 21,

must comply with the requirements of (3).

(3) Smoke detectors referred to in (2) must—

(a) be spaced—

i. not more than 20 m apart and not more than 10 m from any wall, bulkhead or smoke curtain; and

ii. in enclosed malls and walkways in a Class 6 building not more than 15 m apart and not more than 7.5 m from any wall, bulkhead or curtain; and

(b) have a sensitivity—

i. in accordance with AS 1670.1 in areas other than a multi-*storey* walkway and mall in a Class 6 building; and

ii. not exceeding 0.5% smoke obscuration per metre with compensation for external airborne contamination as necessary, in a multi-*storey* walkway and mall in a Class 6 building.

(4) Smoke detectors provided to activate a smoke control system must—

(a) either—

i. form part of a building fire or smoke detection system complying with AS 1670.1; or

ii. be a separate dedicated system incorporating control and indicating equipment complying with AS 1670.1; and

(b) activate a building occupant warning system complying with S20C7, except that smoke detectors provided solely to initiate *automatic* shutdown of air-handling systems in accordance with (2)(a) need not activate a building occupant warning system.

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AMENDMENT HISTORY

Version	Description of changes
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