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| Capital Development Guidelines Series 7, Fire Risk Management  Residential Sprinkler Systems |
| Practice Note – 2019-01 July 2019 |

# Application

Applies to all residential facilities/ properties owned, operated, or funded by the Department of Health and Human Services (DHHS) and provided with an AS 2118.4 sprinkler system. This includes, but is not limited to, Supported Community-Based Houses (Guideline 7.4), Community-Based Houses (Guideline 7.7) and Multi-Storey Residential Buildings (Guideline 7.9).

# Issue

A review of recent audits has identified differences in the application of the Capital Development Guidelines – Series 7 – Fire Risk Management (CDG) requirements for sprinkler protection to:

* Carports, garages attached or within 900mm of the building;
* Areas exempted by AS 2118.4, including open external porches, external balconies and residential bathrooms.

# Background

## CDG 7.4 and 7.7

Clause 2.2.2 of Guideline 7.4 and 7.7 requires that:

In all buildings providing sleeping accommodation for clients, including carports and garages attached or within 900mm, an automatic fire sprinkler system must be installed to comply with either AS 2118.4 or AS 2118.1 as set out below.

* + 1. Where a system is already installed and complies with either AS 2118.1 or AS 2118.4, it must include:

Residential heads in the residential parts of the building; and/or

Fast response heads in all other areas.

* + 1. Where a system is to be installed, it must comply with either AS 2118.1 or AS 2118.4 and must include:

Concealed residential heads in the residential parts of the building; and/or

Fast response heads in all other areas.

The smoke detection and alarm system must be activated upon operation of a sprinkler head.

**Note:** Refer to the requirements of clause 4.5 of CDG 7.2 for installation and design of sprinkler systems.

CDG 7.4 and 7.7 applies to Supported Community-Based Houses and Community-Based Houses respectively, which are typically single storey domestic type buildings. A residential sprinkler system in accordance with AS 2118.4 is generally installed within these buildings.

The revised CDG came into operation on the 14th August 2013, and at that point in time, the relevant versions of AS 2118.4 referenced in the National Construction Code – Building Code of Australia (BCA) 2013 were both AS 2118.4-1995 and AS 2118.4-2012 (transitional period for the new Standard). Depending on which revision of the Standard is adopted, the following table summarizes areas that may have sprinklers omitted.

Table 1: Areas where sprinklers are permitted to be omitted by AS 2118.4

| AS 2118.4-1995[[1]](#footnote-1) | AS 2118.4-2012[[2]](#footnote-2) |
| --- | --- |
| Dedicated water closets not exceeding 2.0 m2 floor area. | Toilets and bathrooms, excluding dual use as a laundry. |
| Clothes closets, linen closets and pantries within the sole occupancy units where the area of the space does not exceed 2.5 m2, and the walls and ceiling are lined with non-combustible materials. | Cupboards, wardrobes, walk-in wardrobes, pantries, alcoves and recesses less than 3.0 m2 and not containing clothes dryers, gas water heaters, or cooking appliances or used for the storage of flammable liquids or cleaners’ equipment. |
| Open external porches, balconies, walkways and stairs. | Open external porches, balconies, carports, walkways and stairs. |
| Roof spaces, crawl spaces, spaces below floor and above ceilings, and other concealed spaces that are not intended, nor used, for living purposes, storage or the installation or equipment such as flexible ductwork, heating and refrigeration equipment. | Sprinklers shall be installed in concealed spaces between ceilings and roofs or ceiling and floors above, and under floors. The following spaces are exempt:   * + 1. Concealed spaces less than 200 mm in depth, measured from the top of the ceiling material to the underside of the floor above.     2. Concealed spaces bound entirely by non-combustible construction, not communicating with other sprinkler-protected spaces, not used for storage of any kind and containing only –   Lighting and power to AS/NZS 3000, or data cables in groups of not more than 15 cables or in cable trays containing not more than 15 cables, where each cable group or cable tray has a clear space of at least 4 times the width of the cable group or cable tray;  Piping containing non-flammable fluids; and/or  Metal ducting with insulation and flexible connections complying with the requirements of AS 4254. |
| Fire isolated stairways. | Fire isolated stairways. |

For a large majority of the existing Department owned CDG 7.4 and 7.7 domestic type buildings, the applicable standard for the existing sprinkler system is AS 2118.4-1995. An audit of these buildings showed that sprinklers were not being provided to connected carports and garages even though they were not explicitly exempt by AS 2118.4-1995. CDG 7.4 and 7.7 therefore specifically nominated the requirement for all carports and garages attached or within 900mm of the building to be sprinkler protected.

## CDG 7.9

Clause 2.2.2 of Guideline 7.9 states:

**Low Rise Buildings**

An automatic fire sprinkler system is not required.

**Medium Rise and High Rise Buildings**

An automatic fire sprinkler system must be installed to comply with AS 2118.1, AS 2118.4 or AS 2118.6, noting that AS 2118.4 is limited in the number of storeys without a fire risk assessment.

* + 1. Where is system is already installed, it must comply with either AS 2118.1, AS 2118.4 or AS 2118.6 and include:

Residential heads in the residential parts of the building; and/or

Fast response heads in all other areas.

* + 1. *Where a system is to be installed, it must comply with either AS 2118.1, AS 2118.4 or AS 2118.6 and* include*:*

Concealed residential heads in the residential parts of the building; and/or

Concealed fast response heads in all other areas.

For medium and high rise buildings, CDG 7.9 provides options as to which sprinkler standard to adopt. Should a designer adopt AS 2118.4, this standard provides concessions to omit sprinklers in a number of areas.

# Analysis

## Carport and Garages

As carports and garages are covered or enclosed spaces, audits of Department owned properties have found that they are being continually used for household storage. Vehicles, paper, cardboard boxes, white goods, gardening tools, flammable liquids (i.e. motor oils), car parts, bins, plastic furniture, etc, are being stored in carports and garages and this increases the risk of fire in these spaces.

The risk associated with a non-sprinkler protected carport or garage attached or located within 900mm of the building (measured from the external wall), is that a fire occurring in this space has sufficient fuel and oxygen to grow to a significant size, spread into the residential part of the building and potentially overcome the residential sprinkler system inside the house.

To mitigate this introduced fire risk, all carports and garages attached or within 900mm of the building are to be fully sprinkler protected regardless of whether AS 2118.4-1995 or AS 2118.4-2012 is adopted.

## External Porches and Verandas

Both AS 2118.4-1995 and AS 2118.4-2012, provide exemptions to omit sprinklers in open external porches, balconies, walkways and stairs. Audits of Department owned CDG 7.4 and 7.7 properties have shown varying interpretation by sprinkler designers when applying this exemption, in particular when determining what are ‘open external porches’.

The Standard permits sprinklers to be omitted in some areas of a building as they present a low fire risk. AS 2118.4-1995 Note1 states:

‘This Standard recommends, but does not require, sprinkler protection of all areas in the building. It permits sprinkler protection to be omitted in areas where the incidence of loss from fire in residential occupancies is considered to be low.’

Similarly, AS 2118.4-2012 C2.2.32 states:

‘Benefits associated with sprinkler systems in accommodation buildings may not be achieved if sprinkler protection is not provided throughout the building. Partial sprinkler system may not deliver the expected life safety performance should a fire initiate in a non-sprinkler-protected area.’

The above statements in the Standards confirm that to omit sprinklers in an area of a building, the sprinkler designer needs to be confident that the space will always present a low fire risk.

To provide clarity as to when sprinklers can be omitted to ‘open external porches’, verandas and the like in Department properties, the Department provides the following advice:

* For porches and any other external covered areas to be considered ‘open external’ they must be ventilated by permanent unobstructed openings on at least 3 sides, and:
  + - The openings are not less than ½ of the wall area (50% free area) of the side concerned; and
    - Openings are located on the top half of the wall.

For an open external porch, sprinklers may be omitted.

* Notwithstanding the above, sprinklers must be installed under all open external porches/ canopies/ verandas/ covered areas where goods are stored or handled; or where the dividing wall between the open external porches/ canopies/ verandas/ covered areas and the building is of combustible construction not achieving an FRL of at least FRL -/30/30. Goods include house hold storage, outdoor furniture, BBQs, etc. Sprinkler protection to the open external porches and other external covered areas should be consistent with that required by AS 2118.1[[3]](#footnote-3) for canopies.
* Open external porches/ canopies/verandas/ covered areas of non-combustible construction less than 2.5 m in width over **pedestrian walkways** may have sprinklers omitted3, subject to the following conditions:
  + - The sprinkler designer must receive written confirmation from the Programme Director or CEO of the Agency that the space beneath the porches/ canopies/verandas/ covered areas will always remain as **pedestrian walkways** without storage or furniture.
    - Staff are to conduct weekly inspections to confirm the space beneath the porches/ canopies/verandas/ covered areas remain as **pedestrian walkways** without storage or furniture.
    - **NOTE:** Provision of sprinklers beneath the porches/ canopies/verandas/ covered areas may be more effective and less onerous than the above conditions.

## Residential Bathrooms

AS 2118.4-2012 now permits bathrooms (of any size) to not be sprinkler protected unless it also contains a laundry. The superseded AS 2118.4-1995 previously only permitted sprinklers to be omitted in water closets less than 2.0 m2.

It is agreed that bathrooms, being wet areas, generally have a low fire risk. The typical bathroom size is generally 3.5 m2 which could accommodate a shower closet, toilet and hand basin. Larger domestic type bathrooms which can also accommodate a bath tub would generally be ~5.0 m2.

The larger the bathroom, the higher the likelihood of a greater number of combustibles including clothes, detergents, mats, etc. Due to the limited storage space in dwellings, apartments and units, it is also now common to see goods being placed in bathrooms if there is sufficient space.

With residential type sprinkler systems, these systems are only designed to operate a maximum of 4 residential sprinkler heads, hence if a large fire occurs in a non-sprinkler protected bathroom it could overrun the installed sprinkler system.

As it is problematic for the Department to control the amount of storage within a dwelling, including the bathroom, an upper bound is required to be provided. Sprinklers in bathrooms can therefore be omitted as follows:

* Where a AS 2118.4-2012 sprinkler system is provided in the building - Any bathroom not exceeding 5.0 m2 in floor area.
* Where a AS 2118.4-1995 sprinkler system is provided in the building – Any water closet/ bathroom not exceeding 2.0 m2 in floor area.

The permitted exception for bathrooms not exceeding 5.0 m2 in floor area to have sprinklers omitted (AS 2118.4-2012 sprinkler system only) is generally consistent with the NFPA requirements, which permit sprinklers to be omitted from bathrooms less than 5.1 m2.

## Covered Balconies

AS 2118.4 permits covered balconies to not be sprinkler protected. An audit of a number of Department owned, medium and high rise sprinkler protected buildings has found that external covered balconies are being commonly used by tenants for storage and in some cases are enclosed by tarpaulin or bamboo screening.

As the amount of storage on external tenant balconies is commonly difficult to control, sprinklers are recommended to be provided to all external balconies to limit the risk of a fire spread via the external balconies.

# Outcome

In summary, for buildings where the CDG are applicable, the following key points are re-iterated in regards to the fire sprinkler system:

Table 2: Scenarios

| Scenario | Sprinklers? |
| --- | --- |
| Carports and garages attached or within 900mm of the building. | Yes |
| External porches/ canopies/ verandahs/ covered areas which do not meet the ‘open external’ definition e.g. only open on one side. | Yes |
| Porches/ canopies/verandas/ covered areas, which meet the ‘open external’ definition, where goods/ furniture are stored or handled. | Yes |
| Porches, canopies and covered areas where the dividing wall between the open external porches, canopies and covered areas and the building is of combustible construction not achieving an FRL of at least FRL -/30/30. | Yes |
| Open external porches/ canopies/ verandas/ covered areas of non-combustible construction and less than 2.5 m in width over **pedestrian walkways** (regardless of the type of construction of the dividing wall between the building and the open external porches/ canopies/verandas/ covered areas).  Written confirmation cannot be obtained from the Programme Director or CEO of the Agency that the space beneath the porches/ canopies/verandas/ covered areas will always remain as **pedestrian walkways** without storage or furniture; or staff cannot commit to conducting weekly inspections. | Yes |
| Open external porches/ canopies/ verandas/covered areas of non-combustible construction and less than 2.5 m in width over **pedestrian walkways** (regardless of the type of construction of the dividing wall between the building and the open external porches/ canopies/ verandas/ covered areas).  Written confirmation obtained from the Programme Director or CEO of the Agency that the space beneath the porches/ canopies/verandas/ covered areas will always remain as **pedestrian walkways** without storage or furniture; and staff can commit to conducting weekly inspections. | No |
| Residential bathrooms not exceeding 5.0 m2 in floor area (AS 2118.4-2012 sprinkler system is provided in the building). | No |
| Residential bathrooms not exceeding 2.0 m2 in floor area (AS 2118.4-1995 sprinkler system is provided in the building). | No |
| Covered external balconies. | Yes |

In some circumstances, the above outcomes can be varied by a Department accredited Fire Safety Engineer via a Fire Risk Assessment. As per CDG 7.1 and 7.2 the DHHS Fire Services Team must be included as a project Stakeholder.

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1. AS 2118.4-1995, ‘Automatic Fire Sprinkler Systems Part 4: Residential’, Standards Australia [↑](#footnote-ref-1)
2. AS 2118.4-2012, ‘Automatic Fire Sprinkler Systems Part 4: Sprinkler protection for accommodation buildings not exceeding four storeys in height’, Standards Australia [↑](#footnote-ref-2)
3. AS 2118.1-2017, ‘Automatic Fire Sprinkler Systems Part 1: General Systems ‘, Standards Australia [↑](#footnote-ref-3)