



STANDARDS
Australia

AS 2118.2—2010

Automatic fire sprinkler systems

Part 2: Drencher systems



Australian
STANDARD

AS



Drencher systems

This Australian Standard® was prepared by Committee FP-004, Automatic Fire Sprinkler Systems. It was approved on behalf of the Council of Standards Australia on 10 June 2010. This Standard was published on 20 August 2010.

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 - Australian Building Codes Board
 - Australian Industry Group
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-

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Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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Australian Standard[®]

Automatic fire sprinkler systems

Part 2: Drencher systems

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PREFACE

This Standard was prepared by the Standards Australia Committee FP-004, Automatic Fire Sprinkler Systems, to supersede AS 2118.2—1995, *Automatic fire sprinkler systems—Wall wetting sprinklers (Drenchers)*.

The AS 2118 suite of sprinkler Standards has been restructured into two groups: Systems (AS 2118 series) and Component (AS 4118 series). The complete series comprises the following:

AS

- 2118 Automatic fire sprinkler systems
- 2118.1 Part 1: General systems
- 2118.2 Part 2: Drencher systems (this Standard)
- 2118.3 Part 3: Deluge systems
- 2118.4 Part 4: Sprinkler systems for accommodation buildings not exceeding four storeys in height
- 2118.5 Part 5: Home fire sprinkler systems
- 2118.6 Part 6: Combined sprinkler and hydrant systems in multistorey buildings

4118

- 4118 Fire sprinkler systems
- 4118.1.1 Part 1.1: Components—Sprinklers and sprayers
- 4118.1.2 Part 1.2: Components—Alarm valves (wet)
- 4118.1.3 Part 1.3: Components—Water motor alarms
- 4118.1.4 Part 1.4: Components—Valve monitors
- 4118.1.5 Part 1.5: Components—Deluge and pre-action valves
- 4118.1.6 Part 1.6: Components—Stop valves and non-return valves
- 4118.1.7 Part 1.7: Components—Alarms valves (dry)
- 4118.1.8 Part 1.8: Components—Pressure-reducing valves
- 4118.2.1 Part 2.1: Piping—General

AS/NZS

- 3500 Plumbing and drainage
- 3500.1 Part 1 Water services

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

A Note to a clause in this Standard is designed to draw attention to a condition that needs to be considered when applying the clause; for example, a reminder that another Standard needs to be consulted which could conflict with the clause. On the other hand, a Commentary (see panel below) is an explanation as to why the clause was written or developed and is primarily intended to assist with how the clause would be applied in practice.

This Standard incorporates a Commentary on some Clauses. The Commentary directly follows the relevant Clause, is designated by ‘C’ preceding the clause number and is printed in italics in a panel. The Commentary is for information only and does not need to be followed for compliance with the Standard.

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FOREWORD

Fire can spread from one building or a source of fire such as storage (fire source) to a nearby building (fire exposed) if the heat radiated by the source impinges on an unprotected opening infill (e.g. a door or window) of the fire exposed building at sufficient levels to cause failure of the infill and ignition of the contents.

The analogy of fire source and fire exposed buildings may also be applicable to internal areas of buildings such as an atrium and its bounding walls or where an egress path passes an unprotected opening in the building.

Research on the behaviour of glazing under radiant heat conditions and its ability to protect openings has shown that when water is sprayed onto a glass infill it can reduce the risk of failure and the passage of radiant heat.

The purpose of drencher systems is to provide sufficient water spray upon opening infills, such as windows, to mitigate the effects of radiant heat from nearby exposure fires.

STANDARDS AUSTRALIA

Australian Standard
Automatic fire sprinkler systems

Part 2: Drencher systems

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out requirements for the design, installation and commissioning of drencher systems intended to provide automatic external protection to windows, doors and other openings from exposure to fire.

C1.1 Drencher systems may be either internal or external; however, this Standard covers external protection of fire exposed building facades only, including the bounding walls of an atrium or where egress paths pass unprotected openings in the building. Radiant heat flux levels are not considered in this Standard.

Where a fire exposed building is protected by an automatic sprinkler system in accordance with AS 2118.1, protection from a fire source may be achieved by external sprinklers fed from that system.

1.2 OBJECTIVE

The objective of this Standard is to provide system designers and installers with a set of requirements for the design, installation and commissioning of drencher systems in order to provide protection to a building that is exposed to an external fire source or an egress path passing unprotected openings in the building.

1.3 APPLICATION

Drencher systems are intended primarily to protect a fire exposed building that is not sprinkler protected.

This Standard may also be applied to infills that open on to an atrium or where egress paths pass unprotected openings in the building. It does not apply to manually-operated systems.

Where a fire exposed building is protected by sprinklers and protection from a fire source is achieved by external sprinklers fed from the building's sprinkler system designed and installed to AS 2118.1, drencher protection in accordance with this Standard is not required.

1.4 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

AS

- | | |
|--------|--|
| 1670 | Automatic fire detection and alarm systems—System design, installation and commissioning |
| 2118 | Automatic fire sprinkler systems |
| 2118.1 | Part 1: General requirements |

AS

- 2419 Fire hydrant installations
- 2419.1 Part 1: System design, installation and commissioning
- 2441 Installation of fire hose reels
- 2484 Fire—Glossary of terms
- 2484.1 Part 1: Fire tests
- 2484.2 Part 2: Fire protection and firefighting equipment
- 2941 Fixed fire protection installations—Pumpset systems
- 4118 Fire sprinkler systems
- 4118.1.1 Part 1.1: Components—Sprinklers and sprayers

AS/NZS

- 3500 Plumbing and drainage
- 3500.0 Part 0: Glossary of terms
- 3500.1 Part 1: Water services

1.5 DEFINITIONS

For the purpose of this Standard, the definitions given in AS 2484.1, AS 2484.2, AS/NZS 3500.0 and those below apply.

1.5.1 Exposure hazard

A potential source of radiant heat that represents a hazard to the fire exposed building.

1.5.2 Fire exposed building

The building or element that could be exposed to radiant heat and may be considered for drencher protection.

1.5.3 Fire source

A building or element that could be a source of radiant heat to the fire exposed building.

1.5.4 Listed

Sprinkler equipment or materials demonstrated to meet AS 4118.1.1 or which have been tested in a specified manner and found suitable for use.

NOTE: Various organizations produce lists of equipment suitable for use in fire sprinkler systems. The means for identifying listed equipment may vary with each organization concerned with product evaluation. Some organizations do not recognize equipment as listed unless it is also labelled. For identifying and nominating a product as listed, reference should be made to the method used by the organization that has listed the equipment.

1.5.5 Opening infill

A door, window, shutter or other element of construction that can be protected against the passage of radiant heat.

1.5.6 Drencher protection

Water applied by a drencher system to an opening infill in an internal or external wall in a manner designed to achieve coverage by direct impingement and rundown.

1.5.7 Open drencher

A sprinkler without a heat-sensitive element (open sprinkler) suitable for use on normally dry pipework in a drencher system.

1.5.8 Relevant authority

An independent agency authorized by legislation or regulation to issue determinations, orders, or other instructions in respect of any subject covered by this Standard.

NOTE: Where adoption of this Standard is not a requirement of a relevant authority but is a requirement of a body such as an insurance company or association, then that body, or its nominees, may perform the functions of the relevant authority for the purposes of this Standard.

1.5.9 Sealed drencher

A sprinkler with a heat-sensitive element (sealed sprinkler) suitable for use on either wet or normally dry pipework in a drencher system.

1.6 TYPES OF SYSTEMS

1.6.1 Wet systems

Wet systems are permanently charged with water and are intended for installation where there is no danger of the water in the pipes freezing. They may or may not incorporate an alarm valve, but will always incorporate an isolation valve (main stop valve) a check valve and system drain valve(s).

C1.6.1 *Wet systems (which incorporate sealed drenchers) are most suitable where there is more than one exposure hazard, or where the protected area is greater than the assumed area of operation.*

1.6.2 Dry systems

Dry systems are described as follows:

- (a) They have normally dry pipework and are intended for use in areas where temperatures are likely to be close to or below freezing.
- (b) They can utilize sealed or open sprinklers.
- (c) They use sealed sprinklers and are permanently charged with air or inert gas under pressure above the alarm valve (dry).
- (d) They utilize open sprinklers and are controlled by a deluge valve that is automatically actuated by either a listed heat-detection system installed to AS 1670 or a sealed sprinkler-detection system located in the same protected area.

A dry system shall incorporate an isolation valve (main stop valve), a check valve and system drain valve(s).

C1.6.2 *Dry (open) systems are most suitable where protection is required from a single, well-defined fire source or where there is the potential for a sudden severe exposure such as with flammable liquid storage. Under this condition, the deluge valve will bring into operation all drenchers in the protected zone. The number of drenchers in simultaneous operation includes all the drenchers in that zone.*

SECTION 2 SYSTEM DESIGN

2.1 GENERAL

Drencher systems may be independent or form part of other fire service installations subject to the requirements of Section 3. Water supplies for these systems shall be in accordance with Section 3.

2.2 OPENING INFILL

Water applied by a drencher system to an opening infill in a wall shall be applied in such a manner as to achieve coverage by direct impingement and rundown.

C2.2 *The provision of drenchers over glazed openings utilizing float glass may not prevent glazing failure. Further, the provision of drenchers over openings (glazed or otherwise) whilst providing a degree of protection against a radiant heat exposure, is not acknowledged as providing any specific Fire Resistance Level (FRL) to that opening. Drenchers rely on providing water flow over an infill surface and are not considered suitable for providing water spray to an unfilled opening.*

2.3 DESIGN FLOW FROM DRENCHERS

Drencher design flow shall comply with the following:

- (a) Drencher systems shall be fully hydraulically designed so that flow from any drencher shall be not less than 100 L/min with a minimum end head pressure of 156 kPa when the required number of drenchers is in simultaneous operation.
- (b) Hydraulic calculation methods shall conform to the requirements of AS 2118.1 as appropriate.

2.4 DRENCHERS IN SIMULTANEOUS OPERATION

Unless otherwise required by the relevant authority, the number of drenchers designed to be in simultaneous operation in a system utilizing sealed sprinklers shall be all those opposite to a single fire source, but not exceeding a maximum of 12.

NOTE: This Clause does not preclude designing for more than 12 drenchers in simultaneous operation, in which case the requirements of Clauses 3.2 and 3.3 should be observed.

2.5 DRENCHERS

Drenchers shall be 15 mm orifice (K factor $8.0 \pm 5\%$) sprinklers of the following orientations, and types as detailed in AS 4118.1.1.

All sealed sprinklers used for exposure protection shall be rated as fast response as defined in AS 4118.1.1 and shall have a temperature rating of not less than 93°C.

Sprinklers shall be any of the following types and orientation:

- (a) *Pendent spray (SP)*—mounted horizontally with the deflector towards the window or wall.
- (b) *Upright spray (SU)*—mounted horizontally with the deflector away from the window or wall.
- (c) *Pendent sidewall (WP)*—mounted pendent and oriented to direct the spray towards the window or wall.

- (d) *Horizontal sidewall (WH)*—mounted pendent and oriented to direct the spray downwards and parallel to the window or wall.
- (e) *Special sprinkler*—sprinkler specifically designed for the purpose and located and spaced in accordance with its listing.

Conventional (CU/P) sprinklers shall not be used.

2.6 DRENCHER SPACING AND LOCATION

2.6.1 Spacing

2.6.1.1 General

Unless specifically listed otherwise, drenchers shall be spaced in accordance with Table 2.1 and as follows: See also Figures 2.1 and 2.2.

- (a) Horizontally at a maximum distance of 2500 mm, and a minimum distance apart of 1800 mm unless separated by a vertical mullion or baffle, in which case the maximum distance from the vertical mullion or baffle shall be 1250 mm.

and

- (b) Vertically to cover each independent opening.
- (c) Vertically at a maximum distance of 4000 mm for glazed walls.

or

- (d) Vertically at a maximum distance of 6000 mm for non-glazed walls.

2.6.1.2 Horizontal spacing

Additionally, a drencher shall be spaced not more than 1250 mm horizontally from—

- (a) the vertical extremities of the protected surface;
- (b) the vertical extremities of each glazed opening, with the sprinkler located within the opening; and
- (c) the centre of any building feature such as downpipes and glazing bars or mullions, which project more than 40 mm from the protected surface.

Where vertical glazing bars or mullions less than 40 mm in width project more than 40 mm but not greater than 250 mm from the glazed surface, sprinklers shall be spaced not more than 2500 mm centre to centre and shall be positioned within 1250 mm of each side of any vertical glazing bar or mullion.

Where the glazing bars or mullions of any width project more than 250 mm from the glazed surface, sprinklers shall be spaced not more than 2500 mm centre to centre and shall be positioned within 1250 mm of each side of any vertical glazing bar or mullion not more than 300 mm from the glazed surface, see Figure 2.2 (a).

Where the glazing bars or mullions more than 40 mm in width project less than 250 mm from the glazed surface, sprinklers shall be spaced not more than 2500 mm centre to centre and shall be positioned within 1250 mm of each side of any vertical glazing bar or mullion not more than 300 mm from the glazed surface, see Figure 2.2 (b).

2.6.1.3 Obstructions

Canopies, awnings, solar screens and the like shall be taken into account in locating drenchers to ensure that direct impingement of water on the infill is not obstructed.

2.6.2 Location

Unless specifically listed otherwise, drenchers shall be located in accordance with Table 2.2 (see Figure 2.3).

2.6.3 Special sprinkler

Special window sprinklers (drenchers) listed for the application shall be installed in accordance with the manufacturer's data sheets.

2.6.4 Detectors

Where a system of heat detectors is utilized, the detector shall be located within 300 mm of each open drencher (see Clause 1.6.2).

TABLE 2.1
DRENCHER SPACING

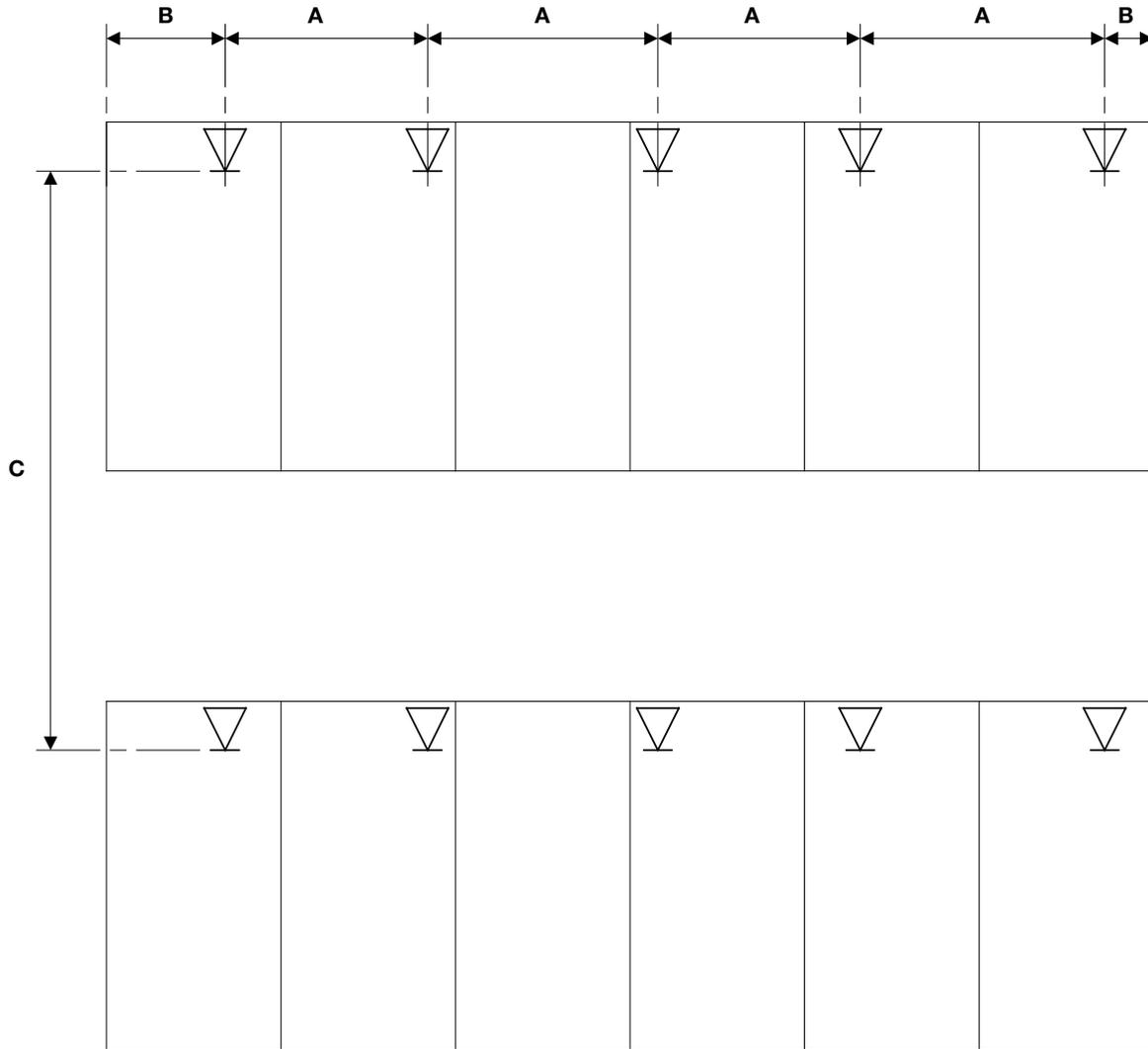
Spacing	Measured	Measurement		Point of measurement
		Maximum	Minimum	
Horizontal	Horizontally	2500 mm	1.8 m (see Note)	Centre of drencher
Vertical-glazed	Vertically	4000 mm	N/A	Deflector to deflector
Vertical-non-glazed	Vertically	6000 mm	N/A	Deflector to deflector

NOTE: The 1800 mm minimum distance may be reduced where drenchers are separated by a baffle or building feature that will prevent cooling from an adjacent operating drencher.

TABLE 2.2
DRENCHER LOCATION

Orientation [1]	Measured	Measurement		Point of measurement
		Maximum	Minimum	
Horizontal	Vertically below top of protected surface	100 mm	50 mm	Centre of drencher
Pendent	Vertically below top of protected surface	100 mm	50 mm	Drencher deflector
SP and SU Horizontal (spray towards wall)	Horizontal from wall	300 mm	100 mm	Drencher deflector
WP Pendent (spray towards wall)	Horizontal from wall	300 mm	100 mm	Centre of drencher
WP Pendent (spray parallel to wall)	Horizontal from wall	100 mm	50 mm	Centre of drencher
WH Horizontal (spray parallel to wall)	Horizontal from wall	100 mm	50 mm	Drencher deflector

NOTE: See Figure 2.3 for examples of drenchers orientation.



ELEVATION

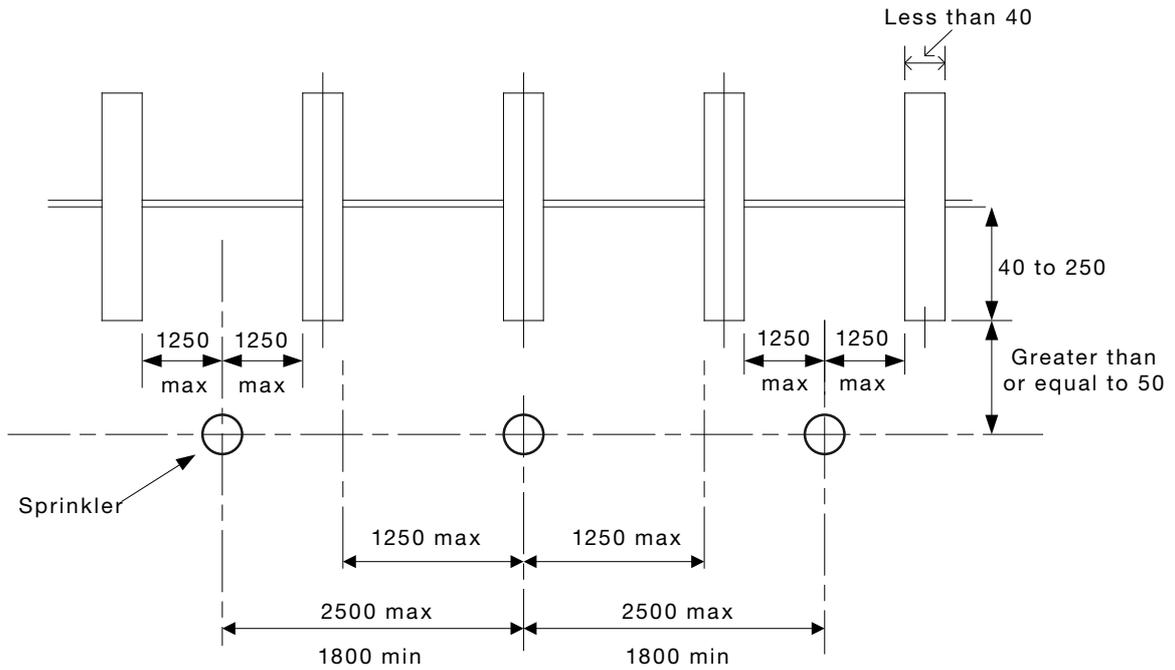
Maximum spacing of drenchers

A = 2500 mm

B = 1250 mm

C = 4000 mm for glazed walls; and 6000 mm for non-glazed walls

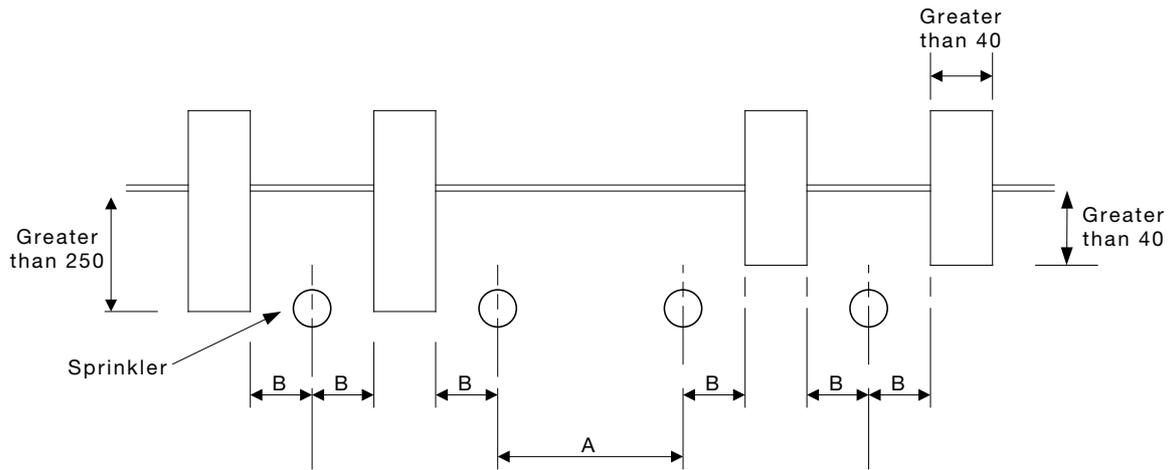
FIGURE 2.1 SPACING OF DRENCHERS FOR GLAZED OPENINGS IN EXTERNAL WALL MULLIONS OR GLAZING BARS NOT MORE THAN 40 mm WIDE AND PROJECTING NOT MORE THAN 40 mm FROM THE GLAZED SURFACE



PLAN VIEW
(maximum drencher spacing)

DIMENSIONS IN MILLIMETRES

FIGURE 2.2(A) SPACING OF DRENCHERS FOR GLAZED OPENINGS SHIELDED BY MULLIONS—SHOWING MULLIONS LESS THAN 40 mm WIDE AND PROJECTING MORE THAN 40 mm FROM PROTECTED SURFACE AND SPACED NOT MORE THAN 2500 mm CENTRE TO CENTRE



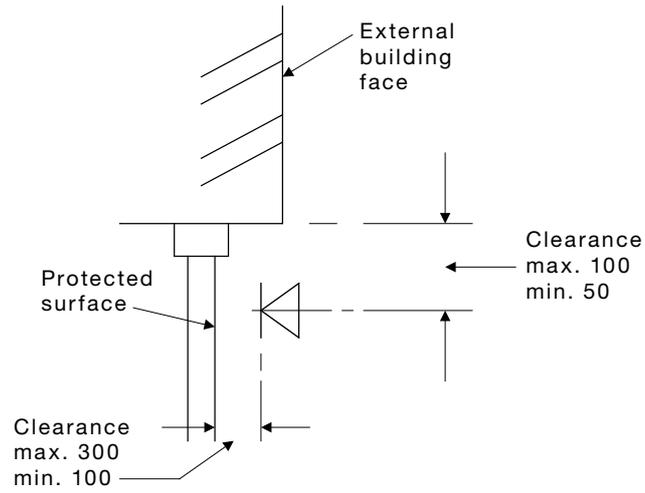
PLAN VIEW

Maximum spacing of drenchers

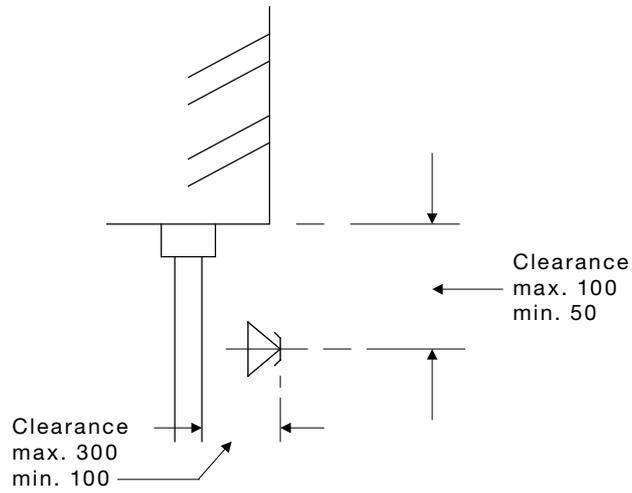
A = 2500
B = 1250

DIMENSIONS IN MILLIMETRES

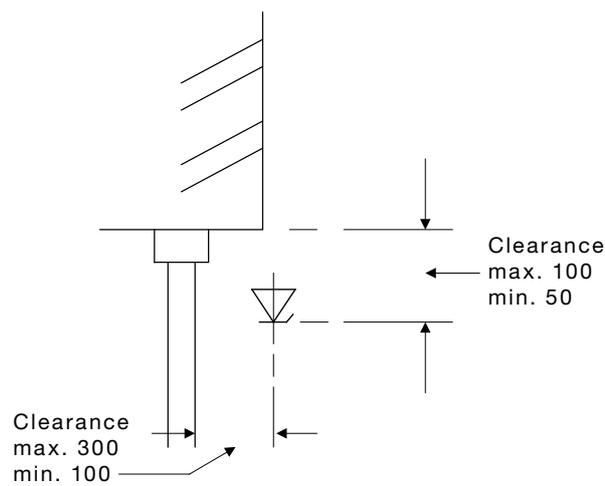
FIGURE 2.2(B) SPACING OF DRENCHERS FOR GLAZED OPENINGS SHIELDED BY MULLIONS—SHOWING MULLIONS MORE THAN 40 mm WIDE AND PROJECTING MORE THAN 40 mm FROM PROTECTED SURFACE OR MULLIONS OF ANY WIDTH AND PROJECTING MORE THAN 250 mm FROM THE PROTECTED SURFACE



(a) Pendent spray sprinkler (SP) installed horizontally



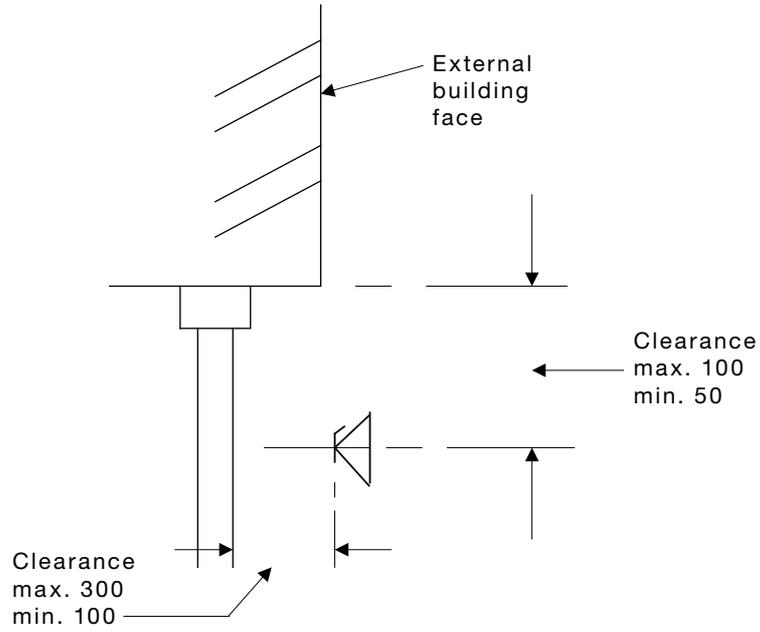
(b) Upright spray sprinkler (SU) installed horizontally



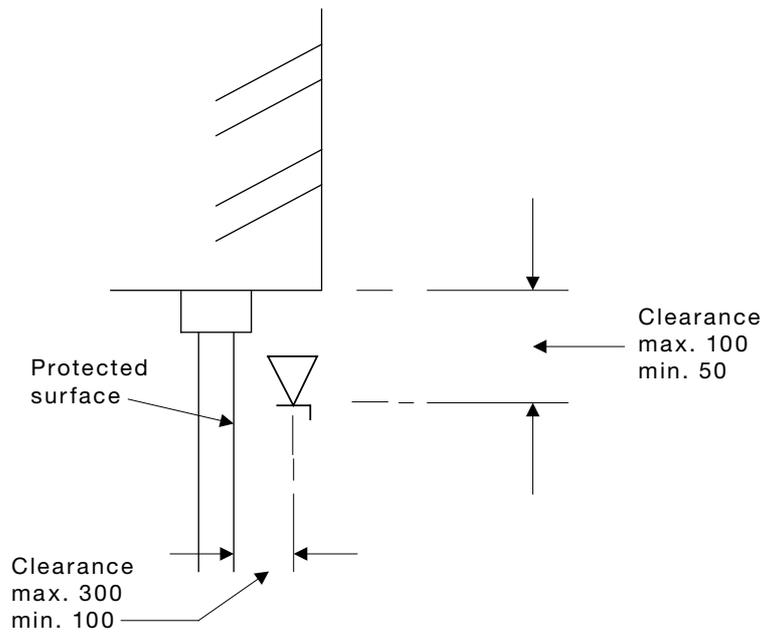
(c) Pendent sidewall sprinkler (WP) installed pendent

DIMENSIONS IN MILLIMETRES

FIGURE 2.3 (in part) ORIENTATION AND LOCATION OF DRENCHERS FOR OPENING INFILL



(d) Pendent sidewall sprinkler (WP) installed horizontally



(e) Horizontal sidewall sprinkler (WH) installed pendent

DIMENSIONS IN MILLIMETRES

FIGURE 2.3 (in part) ORIENTATION AND LOCATION OF DRENCHERS FOR OPENING INFILL

2.7 SHIELDING

Sealed drenchers shall be oriented so that the heat-sensing element is not shielded from direct exposure to the potential fire source.

Sealed drenchers shall be protected from the effects of water discharging from drenchers at a higher level.

NOTE: Shielding may be achieved by locating the drenchers under lintels or other structural features, or by fitting a metal shield not less than 80 mm in diameter immediately above each sprinkler.

Shields shall be suitably protected against corrosion.

SECTION 3 WATER SUPPLIES

3.1 GENERAL

Water supplies for drencher systems shall be in accordance with this Section.

3.2 DRENCHERS CONNECTED TO SPRINKLER SYSTEMS

The water supplies shall be in accordance with AS 2118.1. Where the maximum calculated demand of the drencher protection is in excess of that required for the sprinkler system, the water supply shall be increased to cover the excess.

3.3 DRENCHERS NOT CONNECTED TO SPRINKLER SYSTEMS

3.3.1 Water supplies

Drenchers shall be connected to a water supply as follows:

- (a) A fire hydrant system complying with AS 2419.1. Where the maximum calculated demand of the drencher protection is in excess of that required for the hydrant system, the water supply shall be increased to cover the excess.
- (b) A fire hose reel system complying with AS 2441.
- (c) A separate tapping complying with AS/NZS 3500.1.

3.3.2 Demand exceeds supply

In the case of water supplies in Clause 3.3.1, Items (b) and (c) where system demand exceeds the available water supply characteristics, the following shall be installed:

- (a) Where the water supply has insufficient pressure, an electric pump complying with the residential pump section of AS 2941 and a fire brigade booster (see Clause 3.4).
- (b) Where the water supply has insufficient capacity, a single water supply storage tank with a capacity for 30 min supply and an electric pump complying with the residential pump section of AS 2941 and a fire brigade booster (see Clause 3.4).
- (c) Facilities to provide water supplies (see AS 2118.1).

Where a pump complying with AS 2941 is required, a 'pump running' visual and audible alarm shall be provided with the power supply for the alarm taken from the fire pump power supply.

The drencher system shall incorporate a system isolating valve, secured in the open position by a padlocked chain and labelled in accordance with Figure 3.3.

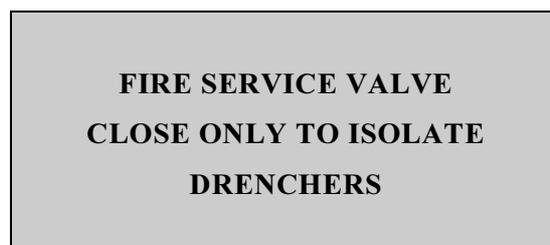


FIGURE 3.3 DRENCHER ISOLATION VALVE LABEL

3.4 FIRE BRIGADE BOOSTER CONNECTION

Where the number of external drenchers located on one façade exceeds 12 or a pump is required, the system shall incorporate a fire brigade booster connection that is remote from the façade, installed after the main isolating valve is accessible to the fire brigade. The number of booster inlets shall be calculated at the rate of not more than 10 L/s per inlet to meet the system design requirements.

SECTION 4 SYSTEM INSTALLATION, COMPONENTS AND PIPING

4.1 GENERAL

Where a drencher system is connected to a fire sprinkler system, fire hydrant system, or fire hose reel system, piping, valves and ancillary equipment shall comply with AS 4118, as applicable and shall be protected against corrosion.

C4.1 *When installing external drencher systems, consideration should be given to access for maintenance, susceptibility to damage, and the long-term deterioration of components due to weathering and to the maintained cleanliness of the glass infills.*

4.2 SYSTEM ARRANGEMENTS

4.2.1 Drenchers connected to sprinklers

Where drenchers are connected to a sprinkler system, the piping arrangement for the drencher system (external sprinklers) shall be in accordance with AS 2118.1.

C4.2.1 *In cases where excessive sprinkler system downtime may be occasioned by the post-fire replacement of external sprinklers, groups of external sprinklers should be connected by dedicated distribution pipes fitted with locked-open isolation valves. The fitting of monitored locked-open subsidiary stop valves on connections to external protection can greatly decrease the time taken to restore a system following an operation of the external sprinklers and should be considered for all such installations.*

4.2.2 Drenchers not connected to sprinklers

Where drenchers are not connected to a sprinkler system, the drencher system piping arrangement shall include a distribution main or mains serving all storeys and be provided with an isolation valve (secured in the open position by a padlocked chain) in an accessible location at street level. The system shall also include adequate signage (see Clause 3.3).

C4.2.2 *On systems with drenchers operating at many different levels it may be difficult to hydraulically calculate a reasonably balanced flow from all drenchers. It may be advantageous in these cases to run a common main to the highest level and have distribution pipes feeding down to the drenchers.*

SECTION 5 COMMISSIONING

5.1 GENERAL

The tests detailed in this Section shall be conducted at commissioning.

5.2 PRE-TEST PREPARATION

Upon completion, the drencher system shall be flushed to remove any debris that may have accumulated within the paperwork during construction of the installation. All required cabinets, doors, hold-open devices, signs, plans, padlocks, chains and any required on-site documentation shall be completed.

5.3 HYDROSTATIC TEST

The piping system shall be tested to not less than 1500 kPa or 1.5 times the maximum working pressure, whichever is the greater. The test shall be applied for a duration of not less than 2 h.

5.4 FLOW TESTS

A flow test shall be carried out to prove that the water supply is capable of meeting the required flow and pressure.

5.5 RECORDING OF TEST RESULTS

Test results shall be recorded on a completion certificate.

NOTE: An example of a drencher system completion certificate is given in Appendix A.

APPENDIX A
 EXAMPLE OF DRENCHER SYSTEM COMPLETION CERTIFICATE
 (Informative)

Name of installer

Address

hereby certify that we have completed on (date).....a drencher system designed and installed in accordance with AS 2118.2, Drencher systems

Name of client

Address of protected premises

Premises known as, or occupied by.....

Type of system.(wet/dry).....

Fire Brigade booster installed yes/no.....

Building protected by sprinklers yes/no.....

The maximum number of drenchers assumed to be operating simultaneously.....

Installation No.	Facade or area protected	Number of drenchers installed	Highest drencher m	Water supply source

Installation No.	Water supply test requirements		Water supply test results		Pump cut-in kPa	
	Flow L/m	Pressure kPa	Flow L/m	Pressure kPa	Required	Results

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Standards Development

Standards Australia

GPO Box 476

Sydney NSW 2001

Phone: 02 9237 6000

Fax: 02 9237 6010

Email: mail@standards.org.au

Internet: www.standards.org.au

Sales and Distribution

SAI Global

Phone: 13 12 42

Fax: 1300 65 49 49

Email: sales@saiglobal.com

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