7.6 LOW LEVEL DRAINAGE

In basements and other areas where sprinkler piping is below the installation drain valves and in other trapped sections in the system, auxiliary drain valves of the following minimum sizes shall be provided:

(a) For pipes up to 50 mm in diameter .....20 mm.

(b) For 65 mm diameter pipes .....25 mm.

(c) For pipes larger than 65 mm in diameter .....32 mm.

7.7 PIPE SIZES

Pipe size shall be determined either by full hydraulic calculation (see Section 12), or partly by pre-calculated pipe size tables and partly by hydraulic calculations in accordance with the requirements for the class of hazard (see Clauses 9.5, 10.4 and 11.4).

7.8 ORIFICE PLATES

Orifice plates fitted to assist in hydraulically balancing a High Hazard class system or to meet pump characteristic curves shall have an orifice diameter of not less than 50% of the diameter of the pipe into which the plate is to be fitted and shall comply with the requirements of Appendix C. Such orifice plates shall be permitted only in pipes of 50 mm in diameter or larger.

7.9 SUPPORT OF SPRINKLER PIPING

When a pipe support system is being designed for a standard fire sprinkler system, consideration shall be given to the correct location of pipe supports and to—

(a) the stresses and loads which may be imposed on the support system from all external causes including differential movement of the building structure and all internal causes including pressure reactions;

(b) the transmission of vibration from the building to the piping and from the piping to the building; and

(c) the effect a corrosive atmosphere may have on the materials used.

Fire sprinkler piping support systems shall comply with the requirements specified in AS 2118.9.

SECTION 8 VALVES AND ANCILLARY EQUIPMENT

8.1 CONTROL ASSEMBLIES

Each installation shall be provided with a control assembly and ancillary equipment comprising the following:

(a) A main stop valve (see Clause 8.2.2).

(b) A valve, comprising either:

  (i) an alarm valve (wet) (see Clause 8.7.1) or an alarm valve (dry) (see Clause 8.7.2); or

  (ii) a composite alarm valve suitable for either wet or dry systems (see Clause 8.7.3).

(c) A water motor alarm and gong (see Clauses 8.10.3 and 3.3).

(d) Direct brigade alarm equipment, where facilities for such are available (see Clause 3.2).

(e) A plan of the risk, i.e. block plan (see Clause 8.3).

(f) Emergency instructions (see Clause 8.5).

(g) A location plate (see Clause 8.4).

(h) A notice identifying the installation and the area served by the installation.

NOTE: Installation control assemblies and ancillary equipment should be placed near a main entrance to the building, in such a location as to be readily visible and accessible to authorized persons.

8.2 STOP VALVES

8.2.1 General

All stop valves (except those fitted by the water supply authorities on the branches from a town main) shall comply with the requirements of AS 4118.1.6.

All valves shall be permanently identified to show their function and normal operating position. All valves on the water supply side of the sprinkler alarm valves shall be subject to the requirements of the water supply authority.

8.2.2 Main stop valves

Water supplies to each sprinkler installation shall pass through a main stop valve. Before passing through the main stop valves, water supplies shall be combined. The main stop valve shall be secured open by a padlocked or riveted strap and shall be adequately protected from the effect of frost.

NOTE: Provision should be made for closure of the main stop valve to give a visible and audible alarm at a place under constant surveillance (see Clause 3.4).

8.2.3 Stop valves controlling water supplies

All stop valves controlling water supplies, except those under control of the water supply authority, shall be secured open by a padlocked chain or a padlocked or riveted strap. In the elevated private reservoirs and gravity tanks, the stop valve shall be fixed close to the non-return valve and on the reservoir or tank side thereof.

8.2.4 Subsidiary stop valves

Stop valves controlling the flow of water to any sprinkler shall not be fitted downstream of the alarm valve except in the following circumstances:

(a) Where monitored in accordance with Clause 3.4.

(b) In connection with hoods over drying ends of a papermaking machine to enable cylinders to be changed.

(c) Where allowance is made for the removal of not more than two sprinklers to facilitate the use of an access hatch.

(d) For controlling groups of external sprinklers.

NOTE: The valve is not required to be monitored (see Commentary to Clause 3.1.2.5 (C3.1.2.5)).

8.3 BLOCK PLAN

A plan of the risk (block plan) with the position of the main stop valves clearly indicated thereon shall be placed adjacent to each set of installation control assemblies or group of valves where it can be readily seen by firefighters and others responding to the alarm. The plan of the risk shall be in the form of a permanent diagram, which water-resistant and fade-resistant, and shall include—

(a) the layout of the protected buildings or areas and adjacent streets;

(b) a diagram of water supplies including sizes and locations of supply authority mains and valves (dimensioned), connections for non-industrial purposes, storage tanks (capacity and locations), and pump duties;

(c) the location of control valves, subsidiary stop valves, remote test valves, tail-end air valves, anti-freeze devices, drains, air release valves, orifice plates, external sprinklers and any unusual features of the installation;

(d) the location and telephone number of the responding fire station.

(e) the location of the main switchboard, distribution boards and starters, and ratings of electrical services associated with all pumps, and details of auxiliary power supply, if applicable;

(f) the location of the stock of replacement sprinklers (see Clause 6.7);

(g) the year of installation of the system and of any major extension thereto;

(h) the height in metres above the installation gauge of the highest sprinkler used for the purpose of sizing the distribution piping for each installation and hazard class and the pressure and flow requirements when carrying out proving tests (see Clauses 9.3, 10.2.1 and 11.2.1); and

(i) the outline of the area of each individual hazard and the design density for that area.

See also Clause 12.16.

8.4 LOCATION PLATE

A location plate shall be fixed on the outside of an external wall, as near to the main stop valve as possible, bearing the following words in clear permanent lettering:

SPRINKLER
STOP VALVE
INSIDE

NOTE: The words SPRINKLER STOP VALVE should be in letters at least 35 mm high, the word INSIDE in letters at least 25 mm high and the words painted white on a black background.

8.5 EMERGENCY INSTRUCTIONS

The following instructions together with an appropriate valve arrangement shall be permanently displayed at the control valves:

EMERGENCY INSTRUCTIONS

1 MAKE SURE THAT FIRE IS OUT.
2 CLOSE MAIN STOP VALVE (SHUTTING OFF WATER SUPPLY).
3 OPEN WASTE VALVE (DRAINING INSTALLATION).
4 TELEPHONE . . . . (see Note)
5 REMAIN AT VALVES.
IF FIRE RE-OCCURS—
(A) CLOSE WASTE VALVE, AND
(B) RE-OPEN MAIN STOP VALVE.

NOTE: The name and telephone number of the maintenance contractor should be inserted.

8.6 NON-RETURN (BACK PRESSURE) VALVES

Where there is more than one water supply to an installation, a non-return valve shall be fitted in each water supply pipe and a test cock shall be provided between the non-return valve and the supply control valve in accordance with the requirements of the water supply authority. Non-return valves shall be readily accessible for testing and maintenance.

All valves on the water supply side of the sprinkler alarm valves shall be subject to the requirements of the water supply authority.

Where the fitting of a non-return valve below ground is unavoidable, the position of the valve shall be indicated and an inspection chamber shall be provided.

Where an elevated private reservoir or gravity tank forms one of the supplies, the non-return valve on the supply pipe shall be not less than 5 m below the base of the reservoir or tank.

All non-return valves shall comply with the requirements of AS 4118.1.6.

8.7 ALARM VALVES

8.7.1 Alarm valves (wet)

Alarm valves (wet) shall comply with the requirements of AS 4118.1.2. They shall be fixed on the main supply pipe immediately above the main stop valve and before any connection is taken off to supply any part of the installation.

8.7.2 Alarm valves (dry)

Alarm valves (dry) shall comply with the requirements of AS 4118.1.7. They shall be fixed on the main supply pipe immediately above the main stop valve (and the alarm valve (wet) in installations on the alternate wet and dry system not employing a composite alarm valve as specified in Clause 8.7.3) and before any connection is taken off to supply any part of the installation.

In dry systems maintained permanently under air pressure, the water motor alarm shall be connected to the atmospheric chamber or the alarm motor auxiliary valve of the alarm valves (dry).

NOTE: In order to facilitate the carrying out of flow tests when an installation is under air pressure, an additional drain valve, of a size appropriate to the hazard class, may be fitted. Alternatively, a stop valve may be installed immediately above the alarm valve (dry) (see Clause 8.2.4(a)).

8.7.3 Composite alarm valves

Composite alarm valves shall comply with the requirements of AS 4118.1.7 and shall be fitted on the main supply pipe and immediately above the main stop valve before any connection is taken off to supply any part of the installation.

NOTE: Composite alarm valves are dual purpose, i.e. they may be used in either wet or dry systems.

8.7.4 Identification of alarm valves and alarm gongs

In buildings containing more than one installation, each alarm valve and alarm signalling device (see Clause 3.2) shall have a number(s) indicated thereon and the relevant alarm gong (see Clause 3.3) shall bear the same number(s) in bold figures.

8.7.5 Accelerators or exhausters for alarm valves (dry system)

A1 Accelerators are devices that are designed to accelerate the operation of an alarm valve (dry) (see Clause 2.3.2.4). They shall be located as close as possible to the alarm valve (dry) or composite alarm valve. The connection to the device from the system shall be so located that the restriction orifice and other opening parts are not likely to become flooded with priming water or back drainage under normal conditions.

8.8 PRESSURE-REDUCING VALVES

Pressure-reducing valves shall comply with the requirements of AS 4118.1.8.

8.9 DELUGE AND PRE-ACTION VALVES

8.9.1 Deluge valves

Deluge valves shall comply with the requirements of AS 4118.1.5.

A1 NOTE: Deluge valves are used to control the water to an array of open sprinklers or sprayers (see Clause 2.3.2.7) which are required to discharge simultaneously. The valve, normally held closed, is released automatically either by the loss of air pressure from independent piping carrying sprinklers acting as heat detectors, or by the operation of heat or smoke detection system. Alarm equipment is normally connected to the outlet piping from the valve so that an alarm is given when water flows into the distribution piping.

8.9.2 Pre-action valves

Pre-action valves shall comply with the requirements of AS 4118.1.5.

NOTE: These valves are used for either of the following purposes:

(a) To control the water supply to a dry sprinkler installation to prevent water discharge from piping or sprinklers which have suffered mechanical damage. The valve, normally held closed, is released by the operation of a heat or smoke detection system and is of similar type to the deluge valve described in Clause 8.9.1, but the sprinkler piping will be charged with air.

(b) To admit water to the piping of a dry installation prior to the operation of a sprinkler or sprinklers. The valve may be a standard alarm valve (dry) (which may be fitted with an accelerator). The heat or smoke detection system is arranged to trip the valve in a similar manner to the operation of an exhauster.

8.10 ALARM DEVICES

8.10.1 General

Each installation shall be so arranged that the installed alarm devices (see Clauses 3.2 and 3.3) shall respond within 3 min of opening the test valve with a 15 mm bore referred to in Clause 8.10.6 and within 6 min of opening the remote test valve referred to in Clause 8.11.

8.10.2 Prevention of false alarms

Where water supplies include a town main known to have widely fluctuating pressure characteristics such that the normal installation pressure is exceeded, causing intermittent operation of the alarm valve, false alarms shall be prevented by one of the following means:

(a) Installation of a listed retarding device.

(b) Maintenance of the installation pressure above the maximum anticipated mains pressure.

8.10.3 Local water motor alarms

8.10.3.1 *General*

Local water motor alarms shall comply with the requirements of AS 4118.1.3.

NOTE: Where an alarm bell is required to be installed in a high level valve room, a pressure switch and electronic bell may be installed in lieu.

8.10.3.2 *Height above valve*

Water motor alarms shall be located not higher than 6 m above the valve(s).

8.10.3.3 *Piping finish and size*

The piping shall comply with the requirements of AS 4118.2.1.

The size of pipe shall be as follows:

(a) Where the length of the piping to the alarm does not exceed 6 m, it shall be not less than 15 mm nominal diameter.

(b) Where the length of the piping to the alarm exceeds 6 m but does not exceed 25 m, it shall be not less than 20 mm nominal diameter.

(c) Where the length of the piping exceeds 25 m, it shall be not less than 25 mm nominal diameter.

8.10.3.4 *Drainage provisions*

Dry, pre-action and all systems in which the water motor alarm piping could be subject to freezing shall have such piping arranged to drain through a fitting having an orifice not larger than 3 mm diameter. The orifice plate (which may be integral with the fitting) shall be either stainless steel or a suitable non-ferrous material such that the hole will not become blocked by products of corrosion.

8.10.3.5 *Alarm valve not to be bypassed*

Except for a water supply shunt apparatus installed for the purpose of continuous main stop valve supervision, no connection between the water supply piping and water motor alarm shall directly bypass the alarm valve.

8.10.4 Fire alarm signal

Fire alarms (see Clause 3.2) connected either directly to a fire service or via a fire alarm monitoring service shall be initiated by—

(a) a flow of water from the alarm valve through a water motor device;

(b) a flow of water from the valve causing actuation of the pressure switch; or

(c) a fall in pressure in the system piping above the alarm valve.

NOTE: Auxiliary alarms may take the form of electric flow or pressure switches. They may be incorporated in the system piping above the alarm valves to indicate on a central panel which particular section of the system is operating.

The feed piping for hydraulically operated alarms shall be fitted with lock-open valves.

8.10.5 Pressure switches

Where a pressure switch used to initiate a fire alarm is connected to the pipe leading to the sprinkler alarm motor, the stop valve controlling the flow of water to the sprinkler alarm motor shall be positioned on the alarm motor side of the pressure switch connection. Where an installation is on the dry system, a means shall be employed to ensure that pressure operation of the switch cannot be prevented either in the event of a fire or during the weekly test of the alarm motor. If at any time the fire alarm signal connection is interrupted, e.g. during hydraulic testing, then attention shall be automatically drawn to this fact by the monitoring service.

8.10.6 Testing of alarm devices

Alarm devices shall be tested through a 15 mm test valve located on the installation side of the alarm valve. Installations on the alternate wet and dry system using both wet and dry alarm valves shall have testing valves fixed both above the dry alarm valve (for use when the installation is under water pressure) and between the wet and dry alarm valves (for use when the installation is under air pressure).

NOTE: The test procedures are set out in AS 1851.3.

8.11 REMOTE TEST VALVES

For the purpose of the commissioning and periodic testing, a remote test valve shall be provided on each installation (see Figure 8.11).

The remote test valve piping shall not be less than 25 mm nominal diameter and shall be taken from the end of a range pipe in the most remote group of sprinklers on the installation.

Where the most remote group of sprinklers is not the highest in the installation, an additional remote test valve shall be connected to the range pipe at the highest level.

The test pipe shall terminate in a smooth bore, corrosion resistant orifice giving a flow equivalent to the smallest orifice sprinkler representative of the installation.

The remote test valve shall be readily accessible, locked shut, and shall be labelled as follows:

SPRINKLER REMOTE TEST VALVE—TO BE LOCKED SHUT

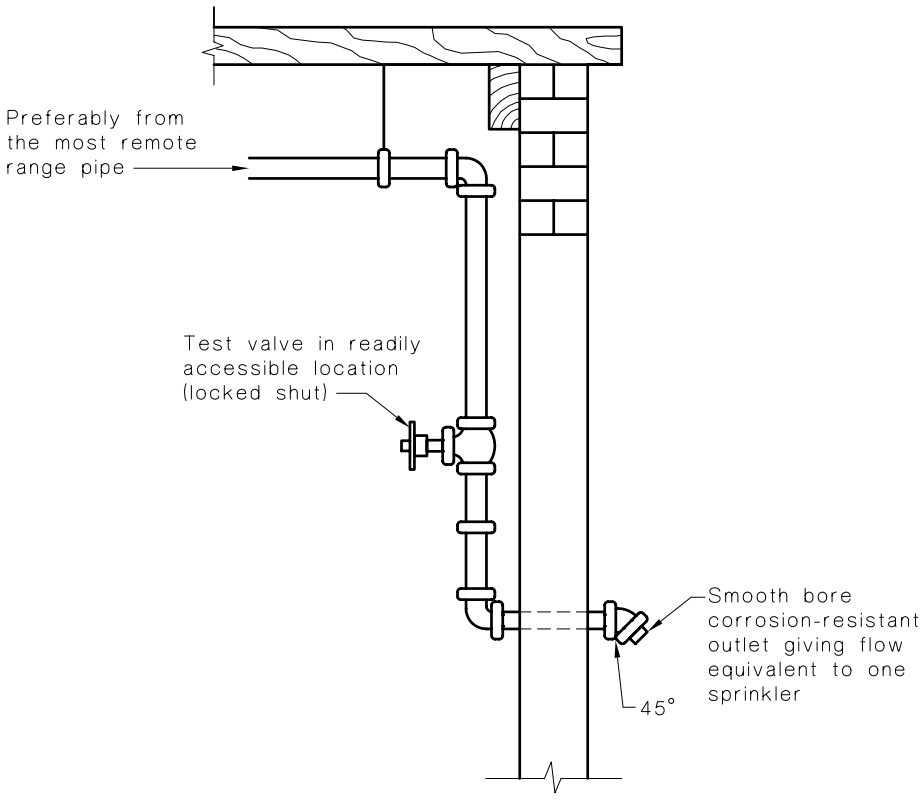

FIGURE 8.11 TYPICAL REMOTE TEST VALVE

8.12 PRESSURE GAUGES

Pressure gauges shall comply with the requirements of AS 1349 and shall have scales with graduations in accordance with Table 8.12.

Means shall be provided to enable each pressure gauge to be readily removed without interruption to installation water supplies.

Gauges to monitor pressures shall be installed in the system at the following locations:

(a) Immediately above the alarm valve.

(b) Adjacent to the main stop valve, connected to indicate the pressure of each water supply. The connection for such gauges shall be on the supply side of the non-return valve nearest the supply.

NOTE: For multiple installation systems, each subsequent main stop valve, or group of main stop valves, may be fitted with a gauge indicating trunk main pressure only.

(c) On the delivery side of all pumps.

(d) On the suction side of all pumps.

A1 (e) On all pressure tanks (see Clause 4.13).

TABLE 8.12

GRADUATION OF PRESSURE GAUGES

Maximum scale reading MPa	Maximum graduation interval kPa
1.0	20
1.6	50
>1.6	100

NOTE: The maximum scale value of gauges should be approximately 150% of the known maximum pressure.

SECTION 9 LIGHT HAZARD CLASS SYSTEMS

9.1 SCOPE

This Section prescribes parameters which if applied to a system design will ensure it will conform to the performance requirements for a Light Hazard class sprinkler system.

C9.1 *A sprinkler system designed to Light Hazard requirements is only suitable for the lightest of fire loads. Because of the specialized sprinklers used and their extended spacing it is impractical to retrospectively increase the performance of such a system.*

Where a risk is to be classified as Light Hazard, the current or possible future fire load should be the same as or similar to those risks listed as Light Hazard occupancies in A1 *Appendix A of this Standard.*

9.2 DESIGN DATA

Light Hazard systems shall be fully hydraulically designed to provide a flow of at least 48 L/min from each sprinkler within each hydraulically most unfavourable group of six sprinklers in all parts of the building regardless of the area covered by individual sprinklers

Each group of sprinklers shall be selected to form, as near as possible, a square with the longest side positioned such that it imposes the greatest hydraulic demand. Except as varied by this Clause, hydraulic calculation methods shall conform to the requirements of Section 12.

9.3 WATER SUPPLY

9.3.1 Pressure and flow requirements

The water supply shall be capable of providing the maximum pressure and flow requirements of the system as determined by the hydraulic calculation methods described in Clause 9.2 for a minimum duration of 30 min.

9.3.2 Water storage capacity

The useable water quantity in a reservoir or pump suction tank dedicated as a sprinkler system supply shall be a minimum of the calculated flow rate for the most unfavourable six sprinklers for a duration of 30 min plus 20%.

The calculated minimum water storage capacity may be reduced by up to a third, provided an automatic inflow to the reservoir or tank is available at all times with sufficient flow to make up the difference within 30 min.

The source of an automatic inflow shall conform to the requirements of Clause 4.3.

9.3.3 Additional storage capacity

The requirement for quantity and duration of any hydrant or other fire protection system connected to the sprinkler system water supply shall be added to the water storage capacity.

9.3.4 Pump suction tanks

A1 Pump suction tanks shall be constructed in accordance with the requirements of Clause 4.8.