

Building Practice Note ESM-08: Water saving options available when testing fire safety systems

This Practice Note provides guidance on the regulatory requirements and water saving options available when testing fire safety systems.

The content below provides guidance on:

- Water use for maintenance of fire safety systems
- Regulatory Requirements
- Water Saving Options
- Australian Standard for routine servicing of fire protection systems and equipment
- Design options for water saving

Abbreviations & Definitions

The abbreviations and definitions set out below are for guidance only. They are not intended to vary those set out in the Building Act 1993 (Act) or the Building Regulations 2018 (Regulations).

- **Act** – Building Act 1993
- **RBS** – Relevant Building Surveyor
- **Regulations** – Building Regulations 2018
- **ESM** – Essential safety measure
- **MBS** – Municipal Building Surveyor

Water use for maintenance of fire safety systems

Hydrants, hose reels and sprinklers need regular maintenance to ensure their reliability. Concerns have been raised by the community, government and the fire protection industry about the large amount of water used in testing, particularly with sprinkler systems.

Significant amounts of water are used in routine maintenance of fire safety systems but building owners can reduce this water consumption in several ways. Water saving methods can include sprinkler alarm testing with proprietary test devices and changes to the test water supply design – see Water Saving Options and Other Design Options for Water Saving below for more details.

Use this format for checklists

Part 5 of the Act sets out requirements for occupying buildings and places of public entertainment. It specifically details when occupancy permits are required and the form and effect of those permits. Part 5 of the Act also details the decision-making responsibilities of the RBS.

Most importantly, section 40 of the Act requires that a person must not occupy a building in contravention of the occupancy permit. This includes any conditions, such as maintenance requirements of the Regulations, to which occupation is subject. Substantial penalties may be applied if the Act is contravened.

Building Permit Requirements

Any building work that affects an ESM, including alternative ESM design options, or work that may adversely affect the safety of the public or occupiers of the building will require a building permit.

Water saving options

Building owners can reduce water consumption in several ways. The simplest and usually least costly method is a maintenance regime under AS1851-2012 – Routine Service of Fire Protection Systems and Equipment. Design options are also worth considering, such as voluntary retrofitting beyond the minimum requirements of the original installation standard, particularly for sprinkler systems, fire pumpset systems and fire hydrant systems.

These options could also be looked at during the design stage of a new building. Water saving methods for testing can include sprinkler alarm testing with proprietary test devices and changes to the test water supply design.

Options for test water supply could include:

- break tanks and return line
- pump recirculating tanks
- variable speed pumps
- remote annubar test facility; and
- recycled water supplies.

Australian Standard for routine servicing of fire protection systems and equipment

Adoption of AS1851-2012

AS1851-2012 is the current Australian Standard for routine servicing of fire protection systems and equipment in buildings. Adoption of AS1851-2012 may result in water saving due to a reduction in the frequency of some testing.

There is no mandatory requirement to use AS1851-2012 unless it is required by a maintenance determination or a condition on an occupancy permit. However, there may be a common law obligation. Building owners, occupiers and service providers need to carefully consider how they will meet their statutory and public safety duties and responsibilities. If AS1851-2012 is not used, owners, occupiers and service providers should satisfy themselves that they have a sound reason for not adopting the latest standard.

Regulations 196 (occupancy permits) and 217 (maintenance determinations) allow the owners of buildings subject to an occupancy permit or a maintenance determination that requires an ESM to be maintained in accordance with AS 1851-2005 or a prior equivalent standard, to elect to maintain the ESM in accordance with AS 1851-2012. Once that decision is made the owner must continue to comply with the 2012 edition.

It is recommended that before making a decision to adopt AS1851-2012, owners ask a suitably qualified and competent person, such as a building surveyor or engineer, to assess their existing fire safety systems and provide advice on potential water savings.

Buildings constructed before 1 July 1994

Owners of these buildings can also adopt the testing regime of AS1851-2012, without the need to amend the certificate of occupancy for their building.

Owners must still maintain the ESMs in their building, but the Regulations do not nominate specific frequency and standards for maintenance. All ESMs must be maintained in a state that enables them to fulfill their purpose.

Owners who decide to use AS1851-2012 should clearly document that maintenance of fire safety systems is being undertaken in accordance with that standard.

Design options for water saving

The following are water saving options for owners and designers. These are not exhaustive. Owners should consult with appropriately qualified persons, such as mechanical engineers, to discuss the most suitable option for each individual situation.

Sprinkler alarm testing

A recirculating pump proprietary test device does not consume water and importantly, retains the non-potable water within the system.

For proprietary devices to be considered, they must be able to fully test a component's functionality in the same way a current test is conducted or so that a similar level of reliability is assured.

Fire system water testing

Water supply testing, at six-monthly and yearly periods, consumes more water than all of the sprinkler fire brigade alarm tests combined. This water is drawn directly from potable supply, making it possible to consider a broad range of water re-use possibilities.

Using fire pumps to boost pressure from the mains water supply can dramatically increase the amount of test water consumed. Monthly pump run testing and annual pump load testing are required, in addition to alarm testing and flow testing.

Although pumps are fitted with relief valves to protect them from overheating and damage when operating with little or no discharge, a much larger valve is required to limit the outlet pressure.

Excess pump pressure is controlled by a relief valve that dumps excess water to waste, bringing the pump back to system maximum pressure. Typically, this is about 25 percent of the pump duty flow.

Pump recirculating tanks

Pump recirculating tanks have a number of benefits. With the tank filled as required and the town main water supply isolated, test water from both pump run and pump load tests is returned to the tank for contained reuse during the test period. After the test, the town main supply is reinstated.

The recirculating tank will need to be designed to cope with the maximum duty pump flow output and to prevent turbulence from return lines. As the pump is still relying on town main supply in a retrofit situation existing pump sets can remain. However, the annual water supply test must be conducted without recycling.

Variable speed pumps

Variable speed pumps are now recognised in AS2419 and can achieve similar outcomes to recycling tanks. Excess pump pressure is regulated by adjusting the pump speed, rather than using a relief valve. However, during the annual pump load test (which requires maximum duty flow), the pump speed cannot be reduced, and test water will still be consumed.

Break tank and return lines

Almost all of the test water can be recycled, if tank return lines are fitted to the pump pressure relief valves and flow test lines. Test water from both pump run and pump load tests can be returned to the tank.

Annual flow testing can be undertaken as part of the annual pump load test. The break tank capacity must be designed to cope with the maximum pump duty flow.

As break tanks rely on tank infill for the total volume of water, an annual flow test of town main supply to confirm tank infill capability is required. This test water cannot be returned to the tank for reuse. However, annual flow testing can be performed as part of the annual pump load test and tank return lines can be retrofitted to the existing water tank supply.

Remote annubar test facility for sprinkler systems

AS2118-1999 requires that an annubar test facility is located at the sprinkler control valve assembly, which may be some distance from the water supply tank. Where long tank return lines are required, consider adding an annubar test facility remote from the sprinkler valve assembly immediately after the pump outlet – as permitted for non-sprinkler fire pump installation. Hydraulic reference point would also have to be added to the new location.

Subsequent editions of AS2118 permit annubars to be located away from the sprinkler control valve and require return lines wherever water supply tanks are fitted.

Recycled water supplies

There are a number of recycled water options that owners can explore to source water that may be treated and made available for firefighting services. Sources may include:

- storm water run-off;
- shower and bathroom water (grey water);
- sewage effluent (black water).

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Related Documentation

- AS1851–2012 Routine service of fire protection systems and equipment
- AS2118.1 Automatic fire sprinkler systems, Part 1 – General systems
- AS2419.1 Fire Hydrant Installations, Part 1 – System design, installation and commissioning
- AS2941 Fixed fire protection installations – Pumpset systems
- Building Act 1993
- Building Regulations 2018

Version History

- Version 2.0, published 28 June 2021, supersedes Practice Note 61: Water saving options available when testing fire safety systems

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