



Technical Advisory Note

TAN
01

**Requirement to consider simultaneous draw from
a single water supply**

Version 1

Approved for release November 2011

FIRE PROTECTION ASSOCIATION AUSTRALIA



Requirement to consider simultaneous draw from a single water supply

FPA Australia aims to promote the protection of life, assets and the environment from fire and related emergencies.

1.0 Purpose Statement

The purpose of this technical advisory note is to provide information and education in relation to considering the simultaneous water supply requirements for fire protection equipment, namely, fire hydrants, automatic fire sprinklers and fire hose reels served by the same water supply.

Where a supply is duplicated (e.g. mains and tank), each is considered as a single supply and should be able to meet the combined system requirements.

2.0 Audience

This technical advisory note is intended for:

- (i) System designers
- (ii) System Certifiers (building surveyors, system commissioners)

3.0 Background

When a fire occurs in a building, it is likely that if the fire is not extinguished in the early stages of growth by intervention from building occupants, that any installed automatic fire sprinklers will operate. In addition, the responding fire brigade may choose to utilise the fire hydrant system to assist with fire suppression beyond fire control provided by the sprinklers and/or to protect other exposures directly or indirectly involved in the fire.

If both the fire hydrant system and automatic fire sprinkler system draw on the same water supply, this supply needs to be able to support the simultaneous operation of these individual systems as there is no certainty that these systems will be operated independently of each other in all instances.

FPA Australia is aware of a number of emerging interpretations of the fire hydrant and automatic sprinklers standards as they relate to the provision of water supply when systems are supplied from a single water supply—i.e. either from a town main supply or static storage tank(s).

In buildings, there may be separate or combined water supply connections for:

- a) fire hydrant systems;
- b) fire hose reel systems;
- c) sprinkler systems; and,
- d) domestic water supplies.

Requirement to consider simultaneous draw from a single water supply

FPA Australia aims to promote the protection of life, assets and the environment from fire and related emergencies.

FPA Australia recommends that, if services draw from a single water supply, the measurement of the water supply requirements for those services should be based on all systems operating simultaneously, regardless of how they are connected to the single water supply.

4.0 Current requirements in Australian Standards

There are several standards—AS 2441.1–2005, AS 2419.1–2005, AS 2118.1–1999, AS 2118.4–1995 and AS 2118.6–1995—referenced by the current Building Code of Australia 2011, which include requirements to consider combined flow performance as follows.

AS 2441.1–2005, Installation of fire hose reels

Clause 6.1 General (under Clause 6 WATER SUPPLY)

“The supply of water to the fire hose reel assembly shall be sufficient to enable the hose reel to deliver the minimum demand specified in Table 6.1, for the two most hydraulically disadvantaged fire hose reels operating simultaneously (except where only one hose reel is installed), plus any probable simultaneous flow.”

FPA Australia considers that “probable simultaneous flow” includes all other services connected to the same water supply. These may include:

- a) Hydrants;
- b) Sprinklers (commercial and residential); and,
- c) Domestic water supplies.

AS 2419.1–2005, Fire Hydrant installations, Part 1: System design, installation and commissioning

Clause 2.1.1 General (under Clause 2.1 Design Concept)

“Where a hydrant system is used to supply water to any other firefighting system other than hose reels, the water supply and system design shall provide for the combined firefighting system(s) requirements. The system requirements shall be determined according to the fire system(s) used to combat a single fire”

Clause 4.2 MINIMUM WATER SUPPLY QUANTITY

“The minimum capacity of the source of water supply for fire hydrant installations shall be not less than that necessary to satisfy the minimum flow rates specified in Clause 2.3.1 or 3.3, as appropriate, for a duration of not less than 4 hours.”

Requirement to consider simultaneous draw from a single water supply

FPA Australia aims to promote the protection of life, assets and the environment from fire and related emergencies.

In addition to clauses 2.1.1 and 4.2, the flow chart in Appendix C of AS 2419.1-2005 outlines the process for ensuring the hydrant installation's water supply requirements are met. However, FPA Australia considers that—while it covers the identification of an acceptable water supply and ensuring that it is capable of meeting the minimum pressure requirements at the specified flow rate—it makes no reference to taking into consideration the demand of other system's operating simultaneously from the same water supply.

AS 2118.1–1999, Automatic fire sprinkler systems, Part 1: General requirements

Clause 4.4.1(a) *(under Clause 4.4. CONNECTIONS TO OTHER SERVICES)*

Water supply for automatic sprinkler and fire hydrant services may be combined subject to:

“The provision of a water supply of sufficient capacity to provide the combined flow requirements for both sprinklers and hydrants.”

AS 2118.4–1995, Automatic fire sprinkler systems, Part 4: Residential

Clause 2.3.2.1 *(under Clause 2.3.2 Connection to town main)*

“The common water supply tapping size shall be determined by adding the domestic demand (subject to the approval of the water supply authority) to the sprinkler demand.

The domestic demand used shall not be less than 43% of the 'Probable Simultaneous Demand for Multiple Dwellings' specified in AS 3500.1.”

Clause 2.3.4 Connection to fire hose reels *(under 2.3 Water supply)*

“Where a fire hose reel is connected to the system, the water supply shall be sufficient to provide for the operation of one fire hose reel in addition to the sprinkler demand requirements.”

Unfortunately, at present there is no direct reference to including fire hydrant water supply requirements in AS 2118.4. However, clause 2.4.3 requires water pressure/flow requirements to be determined by full hydraulic calculations as detailed in AS 2118.1 for the number of designed sprinklers. This can be used to apply a cross reference to AS 2118.1, Clause 4.4.1 (a), above.

Requirement to consider simultaneous draw from a single water supply

FPA Australia aims to promote the protection of life, assets and the environment from fire and related emergencies.

AS 2118.6–1995, Automatic fire sprinkler systems, Part 6: Combined sprinkler and hydrant

Clause 2.8.1 Combined system water flow rate (under 2.8 WATER SUPPLIES)

“The combined system water flow rate shall be the aggregate of the fire hydrant requirement, in accordance with AS 2419, and the sprinkler requirement, in accordance with AS 2118.1, taken at the hydraulically most favourable location determined in accordance with Appendix D.”

5.0 Discussion

The current standards are reasonably clear in relation to the requirement to consider combined water supply requirements when multiple systems are combined (although AS 2118.4 is a slight exception as noted above).

However, if the systems are not combined (i.e. the pipework is independent of each other) and are all connected individually to the same source of water supply some practitioners, certifiers and designers, are not calculating minimum water supply requirements based on all systems operating simultaneously.

This can lead to a situation where the water supply is sufficient to meet the fire hydrant & hose reel flow requirements but not also the automatic sprinkler system requirements and, if required, a percentage of the domestic requirements, all at the same time.

Based on the conservative but reasonable observation that a fire event is likely to activate an automatic sprinkler system, occupants may use fire hose reels and the responding fire agency is likely to use the fire hydrant system whilst the sprinklers continue to operate, the minimum performance of each system will be demanded simultaneously. Accordingly all fire service hydraulic designs should account for this.

6.0 Recommendations

1. Where fire hydrants and fire hose reels, automatic fire sprinklers, and/or other water based fire safety equipment, are connected to a single water supply—either via combined pipework or individual pipework—the minimum water flow requirements must be calculated on the basis that these services will all be operating simultaneously.
2. All water flow calculations are to be based on the flow at the pressure required to satisfy the pressure for the system having the highest minimum pressure requirement.

Requirement to consider simultaneous draw from a single water supply

FPA Australia aims to promote the protection of life, assets and the environment from fire and related emergencies.

3. Where fire systems are required to operate simultaneously, they must be hydraulically designed to calculate the combined flow and pressure requirements at a nominated testing point that complies with the requirements of the applicable Australian Standards. This should be documented accordingly for commissioning purposes and ongoing testing.
4. At the design stage, when requesting water supply performance information (pressure and flow) if water-based fire suppression systems (sprinkler, hydrants, hose reels, etc.) are proposed to be installed and supplied by the same water supply, a request of maximum flow requirements of all systems (and any domestic water supply) should be made of the water authority.

7.0 Disclaimer

The opinions expressed in this correspondence reflect those of FPA Australia. However these are subject to change based on receipt of further information regarding the subject matter. You should interpret the technical opinion or information provided carefully and consider the context of how this opinion/information will be used in conjunction with the relevant requirements outlined in regulations (state and/or federal); standards, codes or specifications; certification; accreditation; manufacturer's documentation and advice; and any other relevant requirements, instructions or guidelines. FPA Australia does not accept any responsibility or liability for the accuracy of the opinion/information provided, nor do they accept either directly or indirectly any liabilities, losses and damages arising from the use and application of this opinion/information.

8.0 References

1. Australian Standard AS 2441-2005 Installation of fire hose reels – Published by Standards Australia International Ltd.
2. Australian Standard AS 2419.1-2005 Fire hydrant installations - System design, installation and commissioning – Published by Standards Australia International Ltd.
3. Australian Standard AS 2118.1-1999 Automatic fire sprinkler systems - General requirements – Published by Standards Australia International Ltd.
4. Australian Standard AS 2118.4-1995 Automatic fire sprinkler systems - Residential – Published by Standards Australia International Ltd.
5. Australian Standard AS 2118.6-1995 Automatic fire sprinkler systems - Automatic fire sprinkler systems - Combined sprinkler and hydrant – Published by Standards Australia International Ltd.



Requirement to consider simultaneous draw from a single water supply

FPA Australia aims to promote the protection of life, assets and the environment from fire and related emergencies.

6. National Construction Code Series – Volume 1, Building Code of Australia – Published by Australian Building Codes Board, Canberra.
7. Fire Protection Association Australia Technical Advisory Committee 4/8/9 (TAC/4/8/9) – Fire Sprinkler and Hydrant Systems, Tanks and Fixed Fire Pumps.

© Copyright 2011 Fire Protection Association Australia.

Material distributed by FPA Australia is subject to copyright. Any information within this publication may not be reproduced in printed or electronic form without permission from FPA Australia. For more information, please see www.fpa.com.au or contact FPA Australia on: (03) 9890 1544.