FIRE + RESCUE

AS2419.1—2021 HCAA Presentation

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A bit about me

- Station Officer FRNSW
- Policy Officer Fire Safety Unit
- Approaching 20 years with the Fire Safety Unit
- AFAC representative on the Australian Standards committees
  - FP009: AS 2419.1 Fire hydrant installations
  - FP008: AS 2304 Water storage tanks for fire protection systems
  - FP004: AS 2118.1 Fire sprinkler systems

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WARNING / DISCLAIMER

- Due to the extent of the changes made to AS2419.1—2021 it is not possible to provide a comprehensive overview of the standard in the time allotted.
- This presentation should therefore be viewed primarily as an overview and a conversation (somewhat one-sided) about the intent of AS2419.1—2021.

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PRESENTATION OVERVIEW

- Some opinions* on risk, the NCC, and AS2419.1.
  - Note. The opinions expressed should not be deemed to be an official FRNSW position.
- A brief history on the evolution of AS2419.1.
- Some of the key drivers of change for AS2419.1.
  - Some of the issues with AS2419.1—2005
  - Adoption of common alternative solutions
  - The ABCB
- Some of the key changes of AS2419.1—2021 & background to the changes made.

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Some thoughts on risk

The take home message

Not all risks are the same, as such, they are not able to be treated the same

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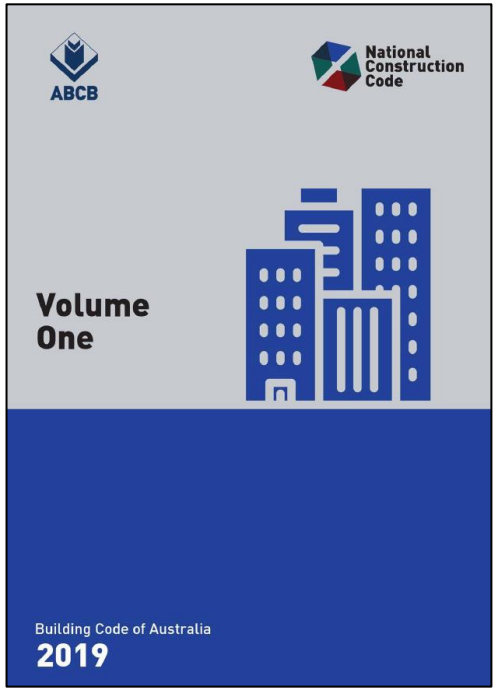
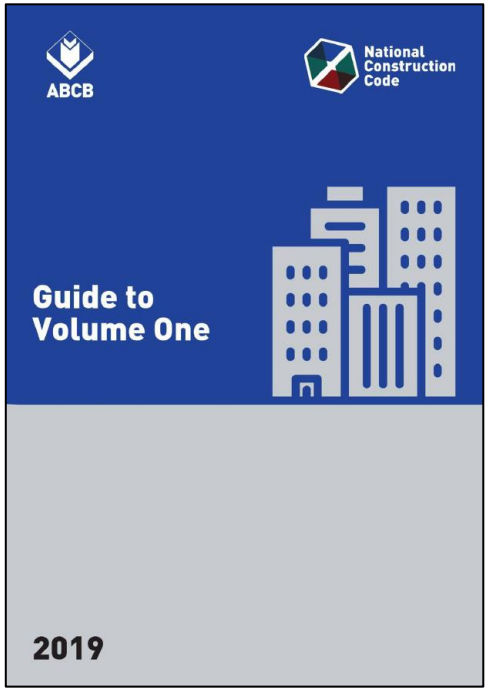
THE NCC and AS2419.1

The minimum or maximum requirements?





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EP1.3 Fire hydrants

A fire hydrant system must be provided to the degree necessary to facilitate the needs of the fire brigade appropriate to—

a) fire-fighting operations; and

b) the floor area of the building; and

c) the fire hazard.

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Some thoughts on meeting EP1.3 Fire hydrants

- Where design options are detailed in AS2419.1, the most appropriate option should be chosen to reduce the **risk** (i.e. sharks, tigers & snakes) to firefighters and to ensure compliance with EP1.3 [i.e. facilitate the needs of the fire brigade appropriate to (a) firefighting operations, (b) the floor area, & (c) the fire hazard.
  - Do the differing booster locations detailed in AS2419.1 facilitate the needs of the fire brigade in all instances? **NO**.
  - Is the provision of an A3 block plan appropriate in all instances? **NO**, particularly when it cannot be read at night in poor light [Block plan size often inadequate]
  - Should a 400 m high building be treated the same as a 30 m building? **NO**.
  - Should a large isolated building (LIB) with a total floor area of 200,000 m^2 be treated the same as an LIB with a floor area of 18,000 m^2? **NO**.

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A very, very, brief history (of an extremely long process): 2005 to 2017

TABLE 2.2

MINIMUM FIRE HYDRANT OUTLET FLOW RATES AND PRESSURES

Fire hydrant type	Minimum required flow rate (L/s)	Minimum required residual pressure (kPa)	
		NSW	All other states and territories
Feed fire hydrant, unassisted	10	150	200
Attack fire hydrant, unassisted	10	250	350
Internal and external fire hydrants when boosted by a fire brigade pumping appliance	10	700	700

TABLE 2.3

FIRE HYDRANT OUTLET FLOW RATES AND PRESSURES

Fire hydrant type	Minimum required flow rate (L/s)	Minimum required residual pressure (kPa)
Attack fire hydrant performance achieved without the use of a fire brigade pumping appliance	5	700
Internal and external fire hydrants when boosted by a fire brigade pumping appliance	10	700

It started here

- Table 2.4?
- No requirements for relay pumps detailed.
- Open Yard protection to Section 2.

TABLE 3.3

NUMBER OF FIRE HYDRANT OUTLETS REQUIRED TO DISCHARGE SIMULTANEOUSLY FOR PROTECTED OPEN YARDS

Area of yard m^2	Number of fire hydrant outlets required to flow simultaneously (see Note)
≤3 000	1
>3 000 to ≤9 000	2
>9 000 to ≤27 000	3
>27 000	4

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AS2419.1—2021: Minimum Pressure & Flow

Table 2.2.6(A) — Feed fire hydrant — Minimum unassisted outlet pressure and flow rate

Fire hydrant type	Minimum required flow rate	Minimum required residual pressure, kPa	
	L/s	NSW	Other States and Territories
External feed or attack/feed fire hydrant located not more than 20 m from a hardstand	10	150	200
NOTE 1 Minimum required flow = 10 L/s × number of hydrant outlets required to flow simultaneously.			
NOTE 2 The different minimum required residual pressures in this table are partially attributable to the different size fire hoses used by fire brigades across Australia; in NSW, 70 mm fire hose is used while in other States and Territories 65 mm fire hose is used.			

Table 2.2.6(B) — Attack fire hydrant — Minimum unassisted outlet pressure and flow rate

Fire hydrant type	Minimum required flow rate, L/s	Minimum required residual pressure, kPa	
		NSW	Other States and Territories
External or internal attack fire hydrant	10	250	350
NOTE Minimum required flow = 10 L/s × number of hydrant outlets required to flow simultaneously.			

Table 2.2.6(C) — Half-duty fire hydrant pumps — Minimum outlet pressure and flow rate

Fire hydrant type	Minimum required flow rate, L/s	Minimum required residual pressure, kPa
External or internal attack fire hydrant supplied by an on-site half- duty fire hydrant pump.	5	700
NOTE 1 The minimum required flow = 5 L/s × number of hydrant outlets required to flow simultaneously, where the building has an effective height not more than 50 m.		
NOTE 2 The 5 L/s flow rate is a concession applied specifically to on-site half-duty fire hydrant pumps. The flow assigned also allows the attending fire brigade to commence initial firefighting activities prior to the fire hydrant system being boosted by a fire brigade pumping appliance.		

Table 2.2.6(D) — Full-duty fire hydrant pumps — Minimum outlet pressure and flow rate

Fire hydrant type	Minimum required flow rate, L/s	Minimum required residual pressure, kPa
External or internal attack fire hydrant supplied by an on-site full-duty fire hydrant pump.	10	700
NOTE Minimum required flow = 10 L/s × number of hydrant outlets required to flow simultaneously, where the building has an effective height more than 50 m.		

Table 2.2.6(E) — Gravity break tanks — Minimum outlet pressure and flow rate

Fire hydrant type	Minimum required flow rate, L/s	Minimum required residual pressure, kPa
Internal attack fire hydrant supplied from a gravity break tank.	10	700
NOTE Minimum required flow = 10 L/s × number of hydrant outlets required to flow simultaneously.		

Table 2.2.6(F) — Minimum fire hydrant outlet pressure and flow rate when boosted by a fire brigade pumping appliance

Fire hydrant type	Minimum required flow rate, L/s	Minimum required residual pressure, kPa
Internal and external attack fire hydrants boosted by a fire brigade pumping appliance	10	700

AS2419.1—2005: Two (2) tables

AS2419.1—2021: Six (6) tables

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AS2419.1—2021: Number of fire hydrants required to flow

Table 2.2.5(B) not shown.

Number of fire hydrants required to flow in this table is based upon the *floor area of the largest fire compartment*.

Table 2.2.5(C) opposite.

Number of fire hydrants required to flow in this table is based upon the *floor area of the largest storey*.

Table 2.2.5(D) opposite.

Number of fire hydrants required to flow in this table is based upon the *yard area*.

Table 2.2.5(C) — Number of fire hydrant outlets required to flow simultaneously — Class 7a open deck car parks

NCC building classification	Floor area of largest storey, m^2	Number of fire hydrant outlets
7a (open deck car park)	≤ 500	1
	> 500 ≤ 5 000	2
	> 5 000 ≤ 10 000	3
	> 10 000	3 plus 1 additional fire hydrant for each additional 5 000 m^2 or part thereof

NOTE For the purpose of determining the number of fire hydrants required to flow simultaneously in an open deck carpark, the floor area of the largest single storey only may be used, irrespective of the openings formed by vehicular ramps between storeys.

Table 2.2.5(D) — Number of fire hydrant outlets required to flow simultaneously — Open yards

Yard area, m^2	Number of fire hydrant outlets
≤ 3 000	1
> 3 000 ≤ 9 000	2
> 9 000 ≤ 27 000	3
> 27 000	4

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A very, very, brief history (of an extremely long process): 2005 to 2017

Directions from the ABCB

- The standard should provide a set of requirements that allows industry to develop a fire hydrant system design for a DTS building without the need to consult the fire brigade.
- Removal of all “subjective’ requirements. (e.g. “… shall be compatible with the equipment and procedures employed by the attending fire brigade …” [from Clause 2.1.1 of AS2419.1—2005])
- Original draft took the form of AS2419.1—2005, where informative comments and notes immediately followed the normative clause.
- ABCB representative directed the committee of FP009 to relocate all informative text to informative appendices (Normative sections generally now contain only normative clauses).
- Informative appendices can be viewed as a guide to AS2419.1 (not unlike NCC guide). And they should be read.
- AS2419.1—2017 published but not referenced by the NCC.

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A very, very brief history (of an extremely long process): 2017 to 2021

- **ABCB Concerns**
  - Indicated that they had a number of concerns with AS2419.1—2017 including; mandating the requirement for a fire brigade booster assembly to be included in a cabinet and using volume as a determinate of risk (i.e. the number of fire hydrants required to flow).
- **AFAC Concerns**
  - ➢ The ever increasing size and height of buildings and the limitations of using only floor area as a determinate of risk.
  - ➢ Due to rapid change in built environment it is not possible for AS2419.1 to provide an off-the-shelf solution for all buildings, particularly with new technologies being regularly introduced (e.g. ASRS).
- Agreed position reached with ABCB for limitations to be placed on the application of AS2419.1—2021 (height, volume, ASRS).
- Performance solutions now required to be developed for buildings outside the scope. (NOTE: AS1170.2 Structural design actions, winds actions is height limited to 200 m).
- Informative appendices included to provide guidance in these areas.

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The re-structure and rewrite

- ***Items outside of the agreed "Scope" were removed from AS2419.1—2017.***
- ***(Where possible) Like items grouped.***
  - AS2419.1—2005 Table 3.3 Number of fire hydrant outlets required to discharge simultaneously for protected open yards.
  - Majority of signage requirements in Section 11.
- ***2 new sections*** AS2419.1—2021 – 12 Sections. AS2419.1—2005 – 10 Sections.
  - Section 8 Pipework design and installation.
  - Section 10 Pipe supports.
- ***More consistent structure across sections.*** Cl 4.2.6.2 *When an on-site water storage tanks is required,* Cl 6.2 *When a fixed on-site pump is required* and Clause 7.2 *When a fire brigade booster assembly is required.*
- ***(Where possible) each normative clause (point) to be associated with a clause number.*** (Not unlike the NCC)
- ***Now more prescriptive.***
- ***Some general themes.*** Concessions provided for sprinkler protected buildings. Common performance solutions codified.

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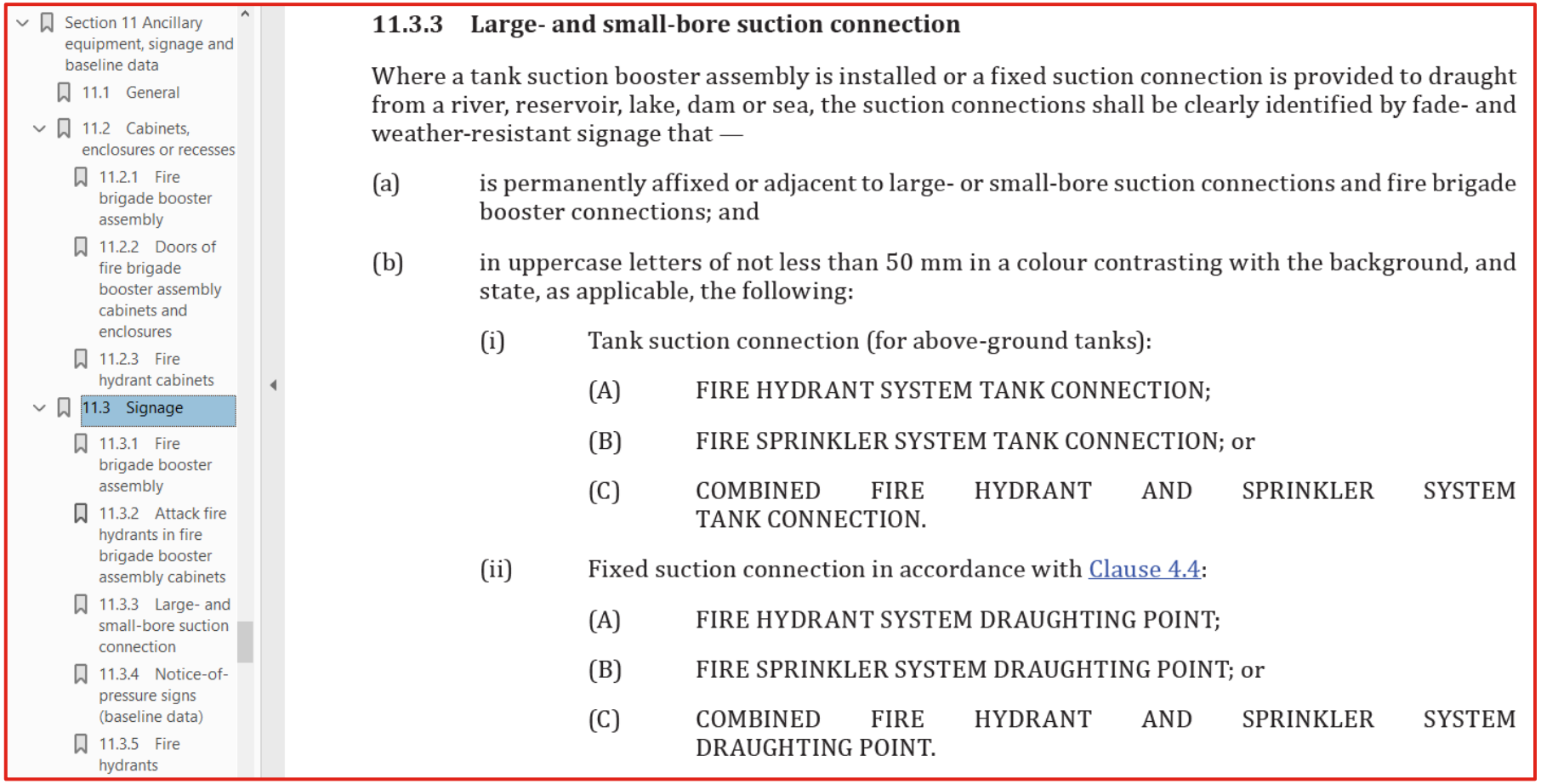
The re-structure and rewrite

Common items grouped.

All items provided with an identifying number to aid with conformance inspections (not dissimilar to the NCC).



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Section 1 – Scope Limitations

- **The biggest change.** The scope of AS2419.1—2021 now details clear limitations on application of the standard.

1.1 Scope

This document specifies the requirements for the design, installation, commissioning and testing of fire hydrant installations.

This document applies to on-site fire hydrant installations for —

(a) class 7b or 8 buildings having a total volume not more than 108 000 m^3;

NOTE 1 See Appendix C for guidance on Class 7b or 8 buildings having a total volume more than 108 000 m^3.

(b) buildings that do not include automatic racked storage systems;

NOTE 2 See Appendix C for guidance on buildings that include automatic racked storage systems.

(c) buildings having an effective height not more than 135 m; and

NOTE 3 See Appendix D for guidance on buildings having an effective height more than 135 m.

(d) buildings and associated areas that do not include special hazards.

NOTE 4 See Appendix E for buildings and associated areas that include special hazards.

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Section 1 Scope Limitations: LIB greater than 108,000 m²

AS2419.1—2005: The problem of floor area as the sole determinate of risk.

- No floor area upper limit (LIB now in Sydney with a floor area greater than 200,000 m²)
- Building height (i.e. volume not considered)

TABLE 2.1

NUMBER OF FIRE HYDRANT OUTLETS REQUIRED TO DISCHARGE SIMULTANEOUSLY ACCORDING TO BUILDING CLASSIFICATION AND FLOOR AREA

Building classification (see BCA)	Fire compartment floor area m²	No. of fire hydrant outlets required to flow simultaneously (Note 1)
All classes sprinklered	>5 000 ≤10 000	2
All classes sprinklered	>10 000	3

Compliance with Item (c) fire hazard of EP1.3?

LIB 1. – Floor area 9000 m². Height 20 m. Total volume = 180,000 m³. Requires 2 fire hydrants to flow.

LIB 2. – Floor area 15000 m². Height 10 m. Total volume = 150,000 m³. Requires 3 fire hydrants to flow.

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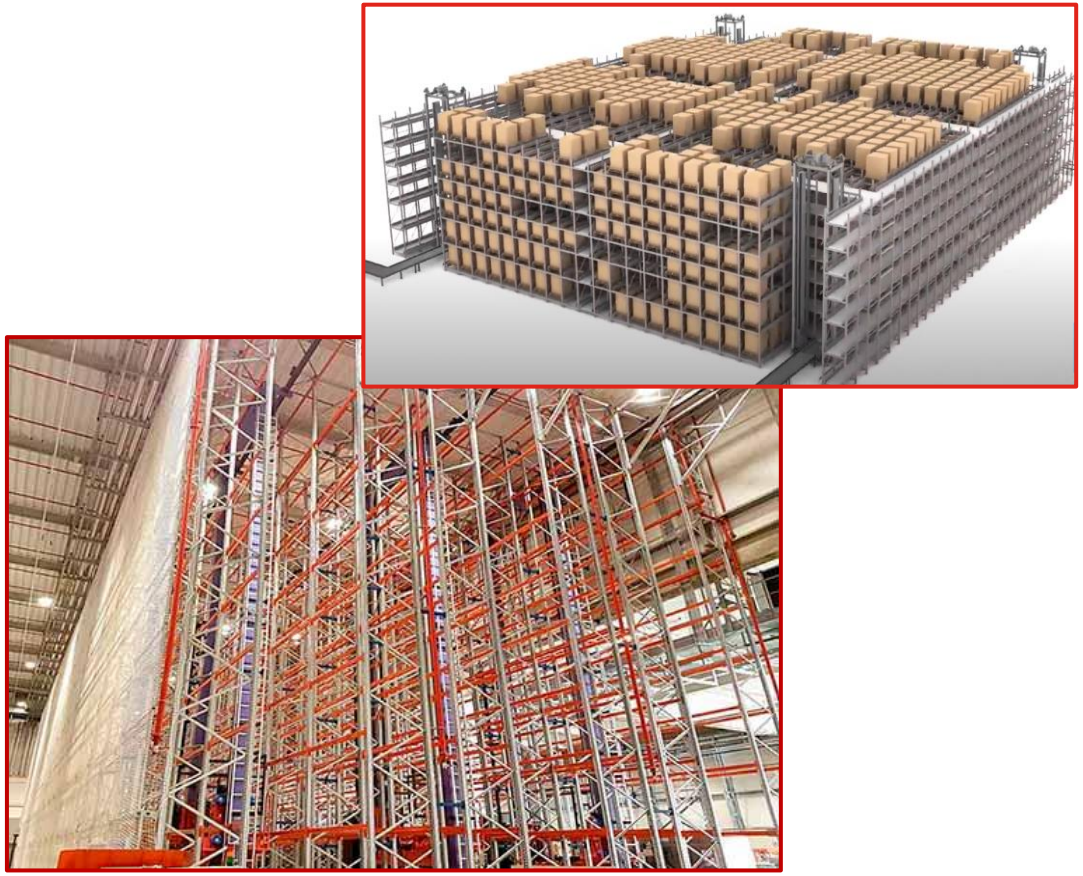
Section 1 Scope Limitations: Automatic storage and retrieval systems.

AS2419.1—2005. The problem of floor area as the sole determinate of risk.

- Standard unable to appropriately address the risks associated with excessive height rack structures and top-loading automatic storage and retrieval systems (ASRS)
- FM Global data sheet 8-34 in part states *“This section provides protection guidelines for top-loading automatic storage and retrieval system (ASRS) storage arrangements that use solid-walled containers (i.e. containers with walls that are not solid are currently outside the scope of this data sheet).*



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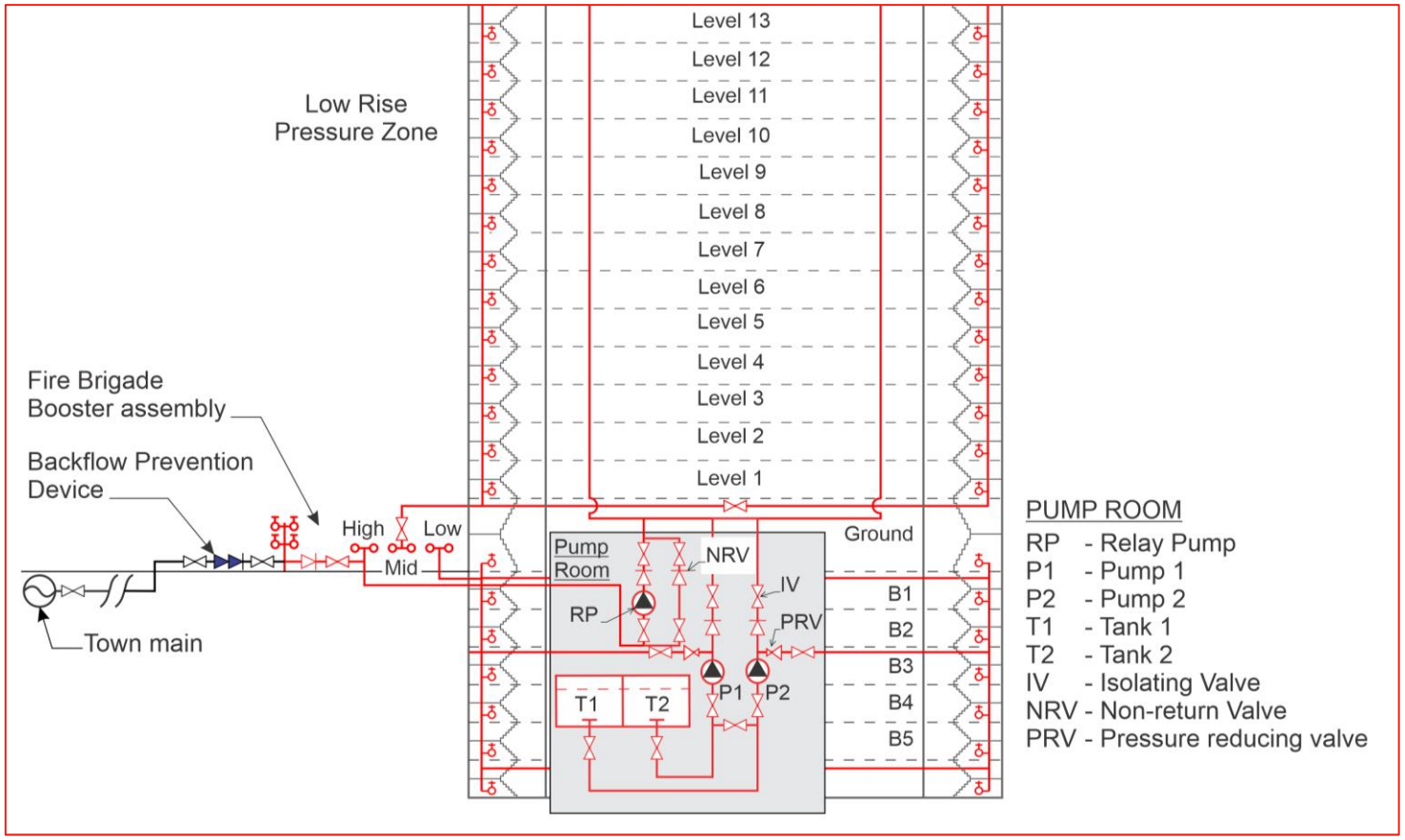
Section 1 Scope Limitations: Buildings with an effective height of more than 135 m

AS2419.1—2005 The limitations of the high rise provisions.

- Automatic starting fire hydrant pumps supplied from an exhaustible water supply.
- No redundancy provided for the relay pump.
- Same design approach applied irrespective of height and risk.

AS2419.1—2021. See Appendix N.



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BREAK

- QUESTIONS?? NONE. Woo. Hoo.