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GL-18: BLOCK PLAN REQUIREMENTS

PURPOSE

To provide guidance to the Building Industry on the requirements for FIRE HYDRANT BLOCK PLANS as stipulated in the Australia Standards and to meet, Department of Fire and Emergency Services (DFES) operational requirements. This information should be read in conjunction with the latest version of the Australian Standard AS2419 Fire Hydrant Installation Part 1 System Design, Installation and Commissioning and AS2118.6 Automatic Fire Sprinkler Systems - Combined Sprinkler and Hydrant Systems in Multi-storey Buildings.

1. BACKGROUND:

There has been confusion on what is actually required to be noted on fire hydrant block plans. The terminology used within the Australian Standards does not give a clear definition on the actual requirements or reference what information should be included to be displayed on the block plan in a manner understood by those involved in the building industry.

2. REQUIREMENTS:

Where a fire brigade booster assembly is installed, there shall be a water-, fade- and weather- resistant block plan(s) that complies with the following;
(Materials or methods of manufacturing the block plan may include; Rowmark, Traffolyte, Stainless Steel or Reversed digital printed decals (also known as single sided window stickers) mounted on clear Polycarbonate/Perspex or acrylic.) Inks must be UV resistance. Other methods will be considered.

LAMINATED PAPER IS NOT CONSIDERED FADE RESISTANT

(a) The block plan shall be permanently affixed within the fire brigade booster assembly cabinet or enclosure in a prominent location.
Not obscured by the assembly or mounted on removable doors. Mechanical mounting is recommended.

(b) Where a fire control room or pump room is provided, an additional copy of the block plan shall be permanently affixed within the room.
Orient drawing **to the reader's aspect** for each of these locations.

(c) The block plan shall be not less than A3 in size and not more than A1 in size and have a maximum scale of 1 to 250.
This will be governed by the size and complexity of the building. Refer to DFES for discussion and support of size prior to manufacturing of the block plan.
Remembering the block plan is primary information for firefighters to use during an incident at late night or early hours when light is minimal.

NOTES:
1 Where the scale of 1 to 250 results in a block plan greater than A1 in size, the scale may be decreased so that the plan will fit on an A1 block plan.

2 Where a single block plan cannot appropriately represent the size and or complexity of the building or site, consideration should be given to the provision of multiple block plans.

3. Where changes occur over levels that are significant to the floor layout multiple block plans may have to be provided.

(d) The block plan shall display a diagrammatic layout of the protected building/s or open yards and adjacent streets. Include such things as Street names and designated building identification if multiple buildings occur on site

(e) The block plan shall be oriented in a manner that reflects the aspect of the fire hydrant installation as it is presented to the reader, with reference to the cardinal points, identifiable surrounding landmarks and features (such as streets, roads, fire isolated stairs, fire indicator panels, etc.).
This should include, for shopping centres, large tenancies (such as Kmart, Target, Coles), for schools, campuses or sites with multiple buildings; building numbers, letters or other identifications.

(f) The block plan shall include a diagram showing—

(i) **the size and location of water supply agency's mains and street fire hydrants**(dimensioned); Refer to the Water Corporations Mapping system or Dial Before You Dig websites.

(ii) **any valves and connections with the water supply serving the building or site; This shall include all non-industrial connections** such as domestic water supply and industrial connections such processing water, fire services and tank fill lines.

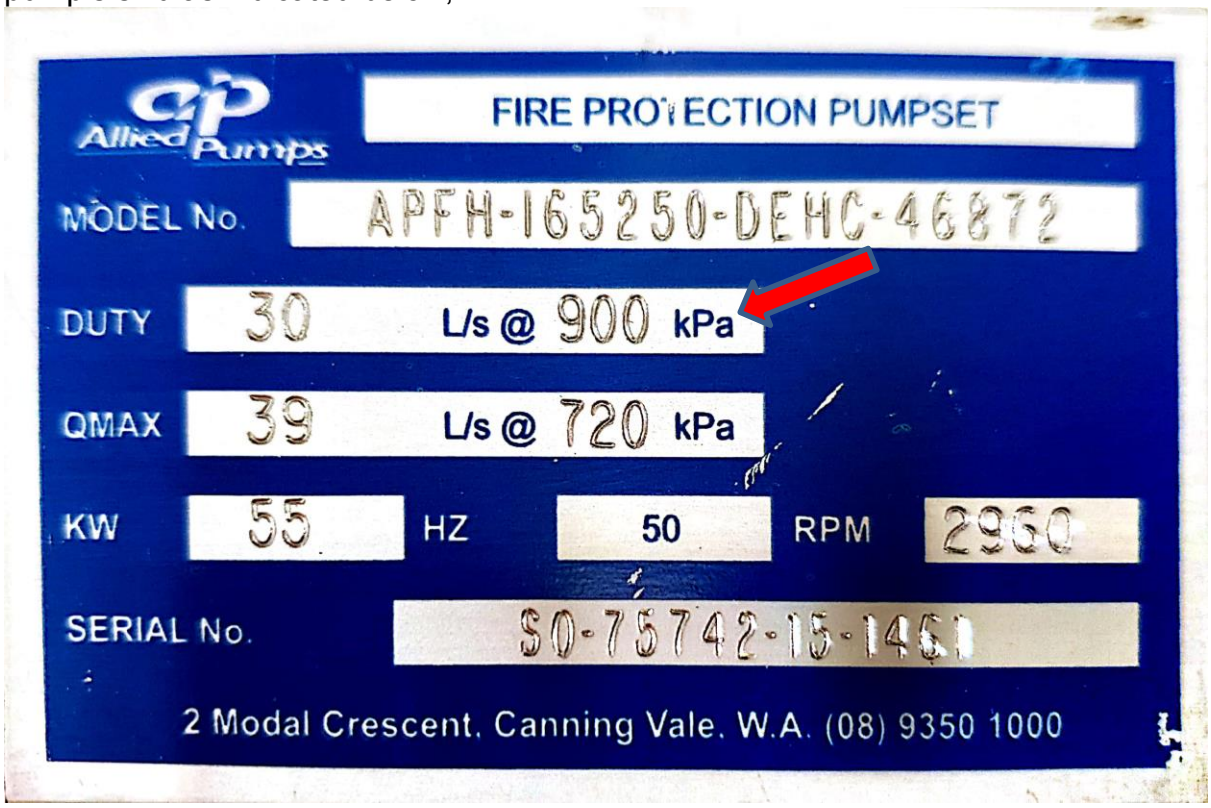
(iii) **the location and size of on-site fire mains**; This is obtainable from the system design drawings and should include materials of construction.

(iv) **the length and size used of any PE underground pipework**; This information is important to future users and maintainers of the system when either firefighting or performing future hydrostatic testing.

(v) **the location and capacities of water storage tanks**; Capacity shall be indicated in Kilolitres or abbreviated as KL and positioned on the tank location on the drawing unless due to scaling of the drawing which then should be indicated in a detailed diagram of the pumps and tanks configuration.

(vi) **the location of pumps**; As per clause above, indicated in location on drawing or in detailed diagram if scale does not allow it to be readable at all times.

(vii) **pressure and flow duties of pumps (kPa and L/s);** This is provided on the pump's skid as indicated below;



(viii) **the location and number of each fire hydrant;** Obtainable from the system design drawings and as per the requirements of clause 3.2.2(e)(2017), to identify by disc of not less than 20mm diameter the fire hydrant number.

(ix) **the location of all fire brigade booster assemblies;** Obtainable from the system design drawings. This shall include sprinkler booster assemblies if no connection between systems is present as an indication of location on site.

(x) **the location and number of any isolating valve;** As per clause 8.5.8 and 8.5.9 (2005) or 9.4.2.1 and 9.4.2.2 (2017) Above and below ground valves, backflow prevention valves, fire hose reel isolation valves, sprinkler valves if connected to any part of the system.

(xi) **the location of any non-return valves**; Don't forget the backflow prevention device, booster non-return valve and any others that may be included in the system's design.

(xii) **any connections to other installed fire protection systems**; These may include sprinklers, drenchers, fire hose reels.

(xiii) **the location of the main electrical switchboards and substation**; Main switch panels and Alternative Energy sources should also be considered for notation.

(xiv) **the location of LPG tanks and gas supply shutdown valve**; Domestic gas valves and meters should be considered

(xv) **the location of all flammable storage areas**; Consider all forms of chemicals, plastics, timber storage areas

(xvi) **the location of any fire indicator panel or fire control centre**;

(xvii) **the location of any sprinkler alarm valve set(s);**

(xviii) **a north point symbol orientated to suit Item (e).**

(g) The block plan shall include the year of installation of the system, any major extensions thereto, any unusual features of the installation and—

(i) **the name of the contractor who installed and/or modified the system;** What also should be considered is a business and afterhours number , licence number

(ii) **the name of the designer of the system;** Full company's name and contact details

(iii) **the system design flow and pressure rate;** See appendix A for definition

(iv) **commissioning pressure and flow rate;** See appendix B for definition, who is responsible, what tests need to be performed and certification.

(v) **the water agency flow and pressure details** under 95th percentile demand conditions; This should be performed at the commissioning of the system near the completion of the project and prior to DFES performing and boosting of the system.

(vi) **the height of the highest fire hydrant outlet** above the lowest booster inlet connection.

Other Items to be considered

- **Residual flow and pressure, of feed hydrant in booster assembly.**
- **Numbering of stairwell when excessive in the building.**
- **Items specific to the project as per instruction by the designer, fire engineer or DFES**

DEFINITIONS TO ASSIST:

APPENDIX A

System Design:

Systems design is the process of defining the architecture, modules, interfaces, and data for a system to satisfy specified requirements. In a fire service these components could be referred as;

- Architecture describes the structure and behaviour of the system.. So the pipework, bends and physical requirements for the system to be constructed.
- Modules are a standard or unit of measure. In fire services this would be considered to the Australian Standards, a fire engineering design or the operational requirements of the local Fire Brigade.
- Interfaces are described as the interconnections between systems, equipment, concepts or human beings. For fire services, this would include the booster assemblies which firefighters put into play, the procedures for using a booster assembly
- Data is the achieved outcomes or the results of testing of the installed systems.

When referring to the Australian Standard AS2419 the follow points provide evidence in regards to what **system design** is within the standard itself.

1.4.1 Design pressure (2005) 1.3.34 Pressure, design (2017)

The pressure, at a defined reference point used in the system design, necessary to maintain the required flow and pressure at the most hydraulically disadvantaged number of fire hydrants that are required to operate simultaneously.

1.4.17 Working pressure (2005)1.3.37 Pressure, working (2017)

The maximum pressure exerted within the system by the fire brigade, the system pumping equipment, or both, when the most hydraulically disadvantaged fire hydrant or fire hydrants are operated at the design flow.

2.1 Design Concept (2005)

Fire hydrant systems designed in accordance with this Standard shall be compatible with the equipment and procedures employed by the attending fire brigade.

2.2 Design Parameters(2005)

2.2.1 Hydraulic design

Hydraulic analysis of fire hydrant systems shall be carried out to demonstrate that, when the specified numbers of fire hydrants are discharging in accordance with Table 2.1 and Table 3.3, the residual

pressure at each fire hydrant is within a range suitable for the fire brigade equipment that is to be connected to them.

The water flow velocity in pipework shall not exceed 4 m/s.

The total hydraulic loss due to friction in pipes, valves and fittings between the inlet connection of the booster assembly and the outlet of the most hydraulically disadvantaged fire hydrant shall not exceed 150 kPa when the required number of most hydraulically, disadvantaged fire hydrants are, each discharging 10 L/s.

2.3 Required System Performance (2005)

2.3.1 Flow requirements

2.3.1.1 General

The outlet of each fire hydrant required to flow in accordance with Table 2.1 and 2.3 shall be capable of discharging not less than the flow rates specified in Table 2.2

Where the unassisted water supply cannot meet the flow and pressure requirements of Table 2.2, a fixed on-site fire pump(s) shall be installed to meet the flow and pressure requirements of Table 2.3.*(Notes *)*

All fire hydrant systems that **incorporate a booster assembly** shall be capable of flowing 10 L/s at 700kPa from the required number of hydrant outlets flowing simultaneously (see Table 2.1 and 3.3) when a fire brigade pumping appliance is connected to the system.

So with all this in mind the definition of **SYSTEM DESIGN** pressure and flow rates as required to be noted on the **block plan,** is the number of hydrants outlets required to flow, multiplied by the maximum flow of 10L/s at 700kPa.whilst a fire brigade pumping appliance is assisting.

System design shall be noted on the block plan as:

10L/s @ 700kPa

or

20L/s @ 700kPa

And so forth as the number of outlets required to flow increases. If a combined sprinkler and fire hydrant booster system, the hydrant and sprinkler flow requirements cumulatively shall be displayed..

No other notations required.

- **The exception to this requirement is Attack Fire Hydrants must be able to flow 10L/s @ 700kPa unassisted.in Western Australia.**
- **“Unassisted” specifies the system performance characteristics achieved by a water agency’s system or other elevated reservoir.**

APPENDIX B

Commissioning

Process by which an equipment facility, or plant (which is installed or is complete or near completion) is tested to verify if it functions according to its design objectives and /or specifications.

Fire hydrant systems designed and installed to AS2419 shall be commissioned by acceptance testing. This is a number of tests involving specific requirements of the installed system to be verified for section 10 (2005) or section 12 (2017)

Acceptance testing shall demonstrate the capability of the system, compared to the design criteria under hydrostatic pressure and dynamic flow conditions.

The acceptance tests and inspections aim to verify the integrity of the installed system, the operational performance of the system against the design criteria, the operational performance of installed pump sets and the supporting and anchoring infrastructure for which is installed as part of the systems.

These tests include where required under these sections;

- Hydrostatic testing of both feed and attack hydrant systems.
- Flow and pressure performance testing
  - ❖ Street Hydrants – if they form part of the fire service to protect the building.
  - ❖ Feed Hydrants – most disadvantaged and booster assembly
  - ❖ Fire brigade booster assemblies
  - ❖ Fire hydrant pumpsets
  - ❖ Dual purpose fire hydrant pumpset(s)
  - ❖ Jockey pumps
  - ❖ Relay pumps
  - ❖ Friction Loss
  - ❖ Multiple firefighting systems
  - ❖ Inflow rate into reduced capacity tank/s

DFES DOES NOT COMMISSION FIRE SAFETY SYSTEMS

DFES involvement in the commission processes listed above is limited to providing assistance with providing a fire appliance to boost the fire hydrant system to record working / boost pressure, relay pumps (where installed) and frictional loss. All other tests performed are to ensure that the installed system can be used and aligns with DFES Operational requirements.

DFES will assist the system installer to obtain results required for compliancy commissioning in multistorey buildings by allowing the swapping out of calibrated equipment the installer uses to record such information.

Upon completion of a test conducted by DFES, DFES will only supply the working/boost pressure figure needed to be signed in the booster cabinet on the notice of pressure.

External feed and attack (pump fed) hydrants testing is the responsibility of the installer to commission these types of systems in accordance to the requirements of the Australian Standards. This should be performed before requesting DFES assistance to boost the fire system.

For a better understanding of what is required, obtaining a copy of the latest Australian Standard AS2419.is the best starting point. Listed in the appendixes of this standard are the required acceptance test criteria to assist installers and builders on all the requirements for a particular system install.

REFERENCES:

Australian Standards 2419.1 (2005) (2017)

LEGISLATION:

Fire Brigade Act 1942
Building Act 2011
Building Regulations 2012 (as amended)
Australian Standards

***Please note**: This is a controlled document. DFES guidelines are available on the DFES Website: www.dfes.wa.gov.au under Regulation and Compliance, Building Plan Assessment then click on Publications/Guidelines. The information contained in this guideline can change without notice to align itself with DFES operational requirements and/or amendments within the relevant standards.*

Should the information provided in this guideline require further clarification, please contact DFES Built Environment Branch via email bebadmin@dfes.wa.gov.au

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