Revised:

Boosting Combined Fire Hydrant / Sprinkler Mains

Objective

The objective of this Technical Note is to clarify the Department of Fire and Emergency Services (DFES) position in respect of the maximum flow rate that should be considered in designs where fire hydrant and sprinkler mains are boosted simultaneously through common booster inlets.

Background

The number of buildings being designed and constructed that have automatic fire sprinkler systems having very high flow rates such as ESFR type systems are increasing as the benefits are increasingly becoming recognised by owners of large floor area buildings.

It is also becoming more common that high flow rate sprinkler system design includes the combining of the sprinkler and fire hydrant boosting through booster inlets that are hydraulically common to both the sprinkler and hydrant system.

Issue

Due to the very high combined flow rate of fire hydrants and sprinklers, the ability to re-establish a water supply to fire hydrants on failure of the on-site fire pumps through

boosting is not possible without recourse to the isolation (shutting off) of the sprinkler system which in turn will dedicate the available water to the fire hydrants only.
System designs that include a requirement to isolate a sprinkler system during a fire incident where a fire may not be contained or controlled or where a sprinkler system has not yet operated for the required duration are not generally supported by DFES.

Where a design incorporates combined boosting of fire hydrant and sprinkler mains, the total required flow rate should not exceed 80 litres per second and 40 litres per second in regional areas having a limited Fire & Rescue Service response.

Where the total combined flow rate exceeds those above, the system is to be designed to permit independent boosting of fire hydrant and sprinkler mains.

Rationale

The rationale used as the basis for this Technical Note is as follows;

1. Booster operation training delivered to Fire & Rescue Service Officers is standardised across the organisation. The training has been developed in line with equipment designed in accordance with relevant Australian standards. One such standard is AS2419.1 Fire Hydrant Installations.

2. Australian Standard 2419.1 Fire Hydrant Installations: Clause 7.4 clarifies that a booster assembly shall permit a fire main to be pressurised without recourse to the manual operation of isolating valves.

3. A limit of 80 litres per second combined boost in metropolitan areas (2 x Fire & Rescue Service pumping appliances) is considered a rational maximum allocation of pumping resources to provide a workable back-up to failure of on-site fire pumps.

4. Training received by Fire & Rescue Service Officers includes avoiding the shutting off of sprinkler systems until such time as;

   a) the fire is extinguished, or

   b) Investigations have proved the sprinkler operation was accidental, or

   c) The sprinkler system flow duration has exceeded the design limits of a combined water supply.

Conclusion

To meet DFES Operational Requirements, fire hydrant systems and sprinkler systems that are designed with combined booster inlets should not have a total combined flow exceeding;

- **80 litres per second** in the Perth metropolitan area (multiple Fire & Rescue Service appliance turnout), and

- **40 litres per second** in regional areas having a limited Fire & Rescue Service response, i.e.,

  - 1 x Career Fire & Rescue Service appliance with 1x Volunteer Fire & Rescue Service appliance back-up, or

  - 1 x Volunteer Fire & Rescue Service appliance response

Examples of a limited Fire & Rescue Service response are;

Albany, Geraldton, Kalgoorlie

1 x Career Fire Station, &

1 x Volunteer Fire Station

Port / South Hedland

2 x Volunteer Fire Stations

Halls Creek

1 x Volunteer Fire Station

no back-up available

Where combined flow rates exceed those described above the fire hydrant and sprinkler systems are to be designed to facilitate independent boosting of each system.

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Contact us

Department of Fire and Emergency Services
Emergency Services Complex
20 Stockton Bend Cockburn Central WA 6164
PO Box P1174 Perth WA 6844
Tel: +61 8 9395 9300
Fax: +61 8 9395 9384
Email: bebadmin@dfes.wa.gov.au
Web: www.dfes.wa.gov.au