

**SINGAPORE CIVIL DEFENCE FORCE
FIRE SAFETY & SHELTER BUREAU**



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Registrar, Board of Architects (BOA)
Registrar, Professional Engineers Board (PEB)
President, Singapore Institute of Architects (SIA)
President, Institution of Engineers, Singapore (IES)
President, Association of Consulting Engineers (ACES)

Dear Sirs

**REDUCED WATER STORAGE REQUIREMENTS FOR
SPRINKLER SYSTEMS IN BUILDINGS [for Ordinary Hazard Groups]**

The Fire Safety and Shelter Bureau (FSSB) has undertaken a study to review the water supply requirements for sprinkler systems in buildings that belong to the ordinary hazard category classification under SSCP 52: Code of Practice for Automatic Sprinkler System. The main purpose of this review is to facilitate the installation of sprinkler systems in existing buildings as reduced sprinkler water tanks would require less space and impose smaller loads on the building structure. The outcome of the study reveals that sprinkler water tank sizes could be reduced, taking into consideration the response time of SCDF's fire fighting crew to fire incidents. The reduction in sprinkler water tank sizes translates into lower installation costs and space savings for building owners and developers who wish to or are required to upgrade the fire protection systems in the buildings.

2 To assist engineers in designing such sprinkler systems, FSSB has developed the attached guidelines entitled "Guidelines on Reduced Water Storage for Automatic Fire Sprinkler in Buildings" with the inputs from the various professional bodies. The guidelines serve as an alternative design approach for the installation of sprinkler systems in both new and existing buildings under ordinary hazard category classification. The guidelines shall take immediate effect.

3 We would appreciate it if you could convey the contents of this letter to members of your organisation. You may reproduce the pages of the guidelines for dissemination to your members. This circular is also available in our website : <http://www.scdf.gov.sg>.

4 For any inquiry or clarification, please contact Mr Vijayaratham at Tel 8481448.

Yours faithfully,

Teo Lim Teck
Secretary
FSSB Standing Committee
for Commissioner
Singapore Civil Defence Force

cc

All members of FSSB Standing Committee
All members of Fire Code Review Committee
President, REDAS
President, IFE
President, SISV
CEO, BCA
CEO, HDB
Group President, PSA
CEO, JTC
CE, LTA – (Attn : Mr. Mohinder Singh)
CE, PSB – (Attn : Ms Tan Chiew Wan/Mr. Lau Keong Ong)

GUIDELINES ON REDUCED WATER STORAGE FOR AUTOMATIC FIRE SPRINKLER SYSTEMS IN BUILDINGS.

1 INTRODUCTION

1.1 The primary purpose of these guidelines is to facilitate the installation of sprinkler systems in existing buildings that are not already protected by sprinkler system and that are in the Ordinary Hazard I, II & III classification. They are also applicable to new buildings having similar hazards. With the timely response by the SCDF, the designated water storage capacities in these guidelines should be adequate for the sprinkler system to control the fire spread till the arrival and the intervention by fire fighters.

1.2 An automatic sprinkler system is expected to provide sufficient evacuation time for the building occupants, assist in preventing fire spread to adjacent spaces/ buildings, limit the environmental impact of fires and provide limited property protection. However, please note that these guidelines set out the minimum water supply requirements for life safety only and not for property protection.

2 GENERAL

2.1 These guidelines shall be read in conjunction with Singapore Standard CP 52: 1990, CODE OF PRACTICE FOR Automatic Fire Sprinkler System [SSCP 52]. Where conflict exists with between CP 52 and these guidelines, the requirements in this guideline shall take precedence.

2.2 In adopting these guidelines in the design of the automatic fire sprinkler system, the QP should inform the Building Owner the limitations of reduced water storage capacities as allowed in these guidelines, prior to the design and installation of the system.

3 SCOPE

3.1 The requirements in these guidelines are only applicable to buildings having hazard classification of Ordinary Hazard Group I,II or III under SSCP 52.

3.2 These guidelines shall only be applicable to buildings of habitable height not exceeding 60m.

3.3 The requirements in these guidelines do not apply to any building housing storage risks and chemical processes.

4 DEFINITIONS

4.1 Reliable Inflow

The inflow to the sprinkler tank is considered reliable if the water inflow rate at the inlet to the sprinkler tank is not less than $1.0 \text{ m}^3 / \text{min}$ and the inlet point is located at reduced level 125m or below.

4.2 Unreliable Inflow

The inflow to the sprinkler tank is considered unreliable if the water inflow rate at the inlet to the sprinkler tank is less than 1.0 m³ / min or the inlet point is located at reduced level greater than 125m.

4.3 Non-modulating type pilot control float valve

PUB approved float valve that is designed to open fully when there is a drop in water level to immediately replenish the tank.

4.4 Constant flow pressure reducing valve

A listed device incorporated in the sprinkler pipe network to ensure that the design flow limitations of the system are not exceeded.

5 DESIGN CONSIDERATIONS

5.1 TANK SIZING

The minimum water storage capacities of the sprinkler tank shall be capable of providing 30 minutes adequate water supply for the sprinkler pump operation.

5.1.1 System with Reliable Inflow

For sprinkler system with a constant reliable inflow from the PUB mains to replenish the sprinkler tank, the effective tank storage capacities for the various hazard categories shall be as follows :-

Occupancy Group	System demand **	Proposed minimum effective capacity of storage tank
OH 1 [72m ²]	540 l/min	12.5 m ³
OH 2 [144m ²]	1000 l/min	25.0 m ³
OH 3 [216m ²]	1350 l/min	37.5 m ³

** the upper limit in column 6 of Table 16 CP 52

5.1.2 System with Unreliable Inflow

For sprinkler system with an unreliable inflow from the PUB mains to replenish the sprinkler tank, the effective tank storage capacities for the various hazard categories shall be as follows :-

Occupancy Group	System demand **	Proposed minimum effective capacity of storage tank
OH 1 [72m ²]	540 l/min	16.2 m ³

OH [144m ²]	2	1000 l/min	30.0 m³
OH [216m ²]	3	1350 l/min	40.5 m³

** the upper limit in column 6 of Table 16 of SSCP 52

5.2 PIPE SIZING

Full hydraulic calculation methods shall be adopted for the design of the sprinkler system pipework. The sprinkler design must ensure that the flow does not exceed the system demand as stipulated in Table 1 & 2, throughout the installation. The flow and pressure limitations can be overcome by employing listed constant flow pressure reducing valves or by including orifice plates at connections to main distribution pipes.

6 WATER SUPPLY

6.1 Size of incoming mains

Pipe size of the replenishing water mains to the sprinkler storage tank shall not be less 150 mm in diameter. Hydrants, hosereel and external drenchers shall not be connected to the sprinkler system or draw from sprinkler water supplies

6.2 Inlet to storage tank

The inlet to the storage tank shall be fitted with listed non-modulating type of pilot float valve.