**SPRINKLER SPECIFICATION FOR RESIDENTIAL**

**(Inclusive of High Rise)**

**BUILDINGS OR OCCUPANCIES**

**DESIGNED UNDER BS9251:2021**

**Responsibilities**, **and Considerations**

This sprinkler specification has been developed to specifically recognise and provide the highest level of fire protection engineering, monitoring, and endurance for project sustainability

Tenders will be strictly in accordance with the specification, drawings and requirements referred to in this specification document. The terms of this enquiry will apply to any contract resulting from this enquiry. Any tender submitted which includes deviations from this specification without prior written agreement will not be accepted.

Valued engineering benefits for the client’s long term project carbon footprint will be given due consideration,

Inclusive of recycling, transportation, and limiting excessive water waste

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1. **Performance Objectives**

The primary objective shall be life safety, aiming to control any fire that occurs within the protected premises to give time for occupants to escape or be rescued. It is assumed in standard BS9251:2021 that the sprinkler protection will form part of an integrated fire safety system as part of the building’s design, and that a fire detection system or interconnected mains-operated smoke alarms shall also be installed to give warning of a fire as early as possible.

2.0 **Conformance of Design and Installation**

Apart from the accepted deviations outlined below, the entire system installation will comply fully with the 2021 edition (including amendments or clarification published by BSi and/or RSA) of BS 9251 Fire sprinkler systems for domestic and residential occupancies – Code of practice.

5.18.3.1 calls for flow-switches used in the sprinkler system to conform to BS EN 12259-2. In addition to this stipulation, any flow-switch that is LPCB, VdS, FM or UL approved will also be acceptable.

Should the contractor wish to add any other deviations, they must be explained and agreed in writing before the contract is awarded.

In addition the system must also comply to other relevant standards such as The Water Supply (Water Fittings) Regulations.

2.1 **Minimum Design Parameters**

The category for the sprinkler system is to be determined by table 1 of BS 9251:2021 in consultation with the sprinkler contractor and stakeholders.

Attention is drawn to table 2 which lays out minimum design parameters for the sprinkler system. The tender document submitted must show how this table and footnotes have been used to create a compliant design.

Particular attention is drawn to note E which should not be activated unless agreed in writing.

2.2 **Additional Measures/Enhancements**

Attention is drawn to section 4.2.3 of BS 9251:2021 which lays out suggestions for additional measures to improve system reliability and availability where this is appropriate. The sprinkler contractor is encouraged to put forward suggestions which can improve the performance of the sprinkler system to meet the particular scope of the project.

3.0 **System Operation Alarm**

Project Fire’s Residential Zonechecks shall be installed at each sprinkler zone. These devices shall be connected via an addressable loop to a compatible centralised controller compliant to section 5.18.3.3 of BS 9251:2021, available through Project Fire Products. The sprinkler alarms shall integrate into the wider fire alarm via one of these options:

1. By linking the Zonecheck Addressable controller to a fire alarm panel, BMS panel or similar
2. By taking signals from each IMM to a fire alarm panel, BMS panel or similar
3. By taking signals from each flow-switch to a fire alarm panel, BMS panel or similar

4.0 **Water Supply**

The sprinkler systems shall be connected to a reliable and sustainable supply as outlined in section 5.11 of BS 9251:2021. Different water supply options shall be discussed and agreed upon before any tender document is submitted.

For category 4 projects, particular attention is drawn to section 5.12.5 of BS 9251:20121 which must be complied to.

In addition, an alternative water supply/storage options may be considered such as a Pressurecheck, available from Project Fire products Ltd. A pre-packaged water supply module with water chamber, pump, controller and initiation board specifically designed and manufactured to boost low pressure town mains supply.

4.1 **Local Water Authority**

In all cases the water authority/company shall be approached before a connection is made to the mains supply.

4.2 **Backflow Prevention Devices (check valves)**

A backflow prevention device shall be fitted in compliance with clause 5.11.5 of BS9251:2021. Backflow prevention devices restrict water flow, double check valves significantly more than single check valves, and their resistance or friction loss shall be considered in hydraulic calculations where appropriate.

4.3 **Stored Water Supply**

Stored water supplies shall be installed in accordance with section 5.11.4, BS9251:2021. Water tanks shall be covered to prevent the entry of foreign objects such as birds and rodents etc. Water tanks for sprinkler use shall also be protected from freezing.

5.0 **Sprinkler Heads**

Sprinkler heads shall be supplied manufactured to either BS EN 12259-14 or BS EN 12259-1 in accordance with section 5.5 and 5.6 of BS 9251:2021. Sprinkler heads shall be cared for in accordance with clause 6.1.3, BS 9251:2021.

Sprinkler heads in residential areas shall be rated as either fast response or quick response and be suitable for the location that they are being used. Factors such as ceiling type, orientation, ambient temperature, local environment, occupancy, and security shall all be considered when selecting sprinkler heads.

Sprinkler heads installed in non-residential areas shall be rated as quick response and be suitable for the location that they are being used. Factors such as ceiling type, orientation, ambient temperature, local environment, occupancy, and security shall all be considered when selecting sprinkler heads.

5.1 **Sprinkler Design/Spacing**

Sprinkler heads shall be installed in accordance with section 5.7 of BS 9251:2021 and manufacturer’s instructions. Manufacturers’ data-sheets shall be consulted with sloped ceilings, location of sprinklers in relation to beams and other requirements specific to each sprinkler head.

5.2 **Sprinkler Coverage (extent of sprinkler protection)**

Sprinkler coverage shall be provided in all common areas, plant spaces and non-residential areas within the building unless specifically excluded elsewhere in this document.

Sprinkler coverage within individual apartment shall comply to section 5.4 of BS 9251:2021.

5.3 **Shadow Areas**

Where shadow areas are utilised, they must be in accordance with section 5.7.2 and details of the calculations shall be shown on the design drawings issued by the sprinkler contractor.

6.0 **Sprinkler Zoning**

Zoning of the sprinkler system shall comply with 5.1 of BS 9251:2021 as a minimum. Attention is drawn to note 2 of section 5.1 of BS 9251:2021 which encourages the use of additional zones to aid future maintenance and provide more exact information on the location of any sprinkler activation. Consideration shall be given to increasing the number of zones per floor to separate into each tenancy, ownership, or use.

Each sprinkler zone shall comprise of a Residential Zonecheck, monitored isolation valve and suitable test/drain arrangement including pressure gauge.

6.1 **Core Riser**

The outlet connection from the pump-set deliveries should be routed in a core riser (with other services) with a connection for each floor. This connection shall comprise of a monitored isolating valve and an automated flow switch testing device, namely Zonecheck available from Project Fire Products. This equipment must be accessible and shall be periodically tested. The flow-switch and local monitored valve shall be wired to the local IMM as part of the Zonecheck Addressable system.

6.2 **Individual Apartment Protection**

For each tenant’s premises a separate connection to each apartment with a monitored isolation valve and a Residential Zonecheck shall be used and integrated with the specific fire detection and or security alarms with sounder levels that must be agreed with the local fire officer.

Where a sprinkler system is installed in any residential / domestic property, a Zonecheck device to enable routine testing of the flow-switch without the escape of water shall be included. Testing will be conducted by the Zonecheck Addressable system.

6.3 **Non-Residential Areas**

Non-residential areas shall be sprinkler protected in accordance with section 5.5 and section 5.6 of BS 9251:2021 following any clarifications issued by BSi, BAFSA or RSA.

No non-residential fire compartment shall exceed 100m2.

The non-residential areas shall be suitability sub-divided into separate sprinkler zones, see section 6.0 of this specification.

7.0 **Pipework and Fittings**

Core riser and distribution pipework to be of a suitable metal construction.

Pipework in accommodation areas can either be metal or LPCB approved CPVC. Special care must be taken to ensure that any products coming into contact with the CPVC pipework (sleeves, mastics, sealants etc.) is compatible and will not cause any reaction which could weaken the pipe.

8.0 **Sprinkler Contractor**

Contractors shall be qualified and experienced. All sprinkler contractors shall be LPS 1048 accredited, level 4 approved, listed in the Red Book and be able to demonstrate that appropriate staff members have the competency to design and install systems to BS 9251:2021. Installers shall ensure that their staff are fully trained and are fully conversant with the design and installation practices of Residential and Domestic sprinkler systems and can demonstrate competency within this scope of work.

9.0 **Fire Pump**

Pumps must be selected and installed in accordance with section 5.12 of BS 9251:2021. Specialised pump packages suitable for domestic and residential sprinkler systems are available from various manufacturers and shall be selected to meet the requirements of the induvial project.

The electrical supply to the pumps shall be in accordance with section 5.12.2 of BS 9251:2021. Fuses, electrical switch gear and trip functions associated with fire pumps must be sized in accordance with approved fire pump manufacturer guidelines and not sized to protect the equipment.

10.0 **Valves and Stop Valves**

Valves should be suitable for sprinkler systems and conform to section 5.15 of BS 9251:2021.

All stop valves shall be of the monitored type as well as being secured in the correct position. Monitoring of the valves shall be achieved via the Zonecheck Addressable system.

11.0 **Drainage**

The sprinkler contractor is to consider how all sprinkler pipework could be drained in an efficient manner. As a minimum, a drain valve in compliance to 5.15.e of BS 9251:2021 shall be installed.

12.0 **Frost Protection**

Pipework requiring protection from freezing shall be protected using the methods outlined in Section 5.17 of BS 9251:2021.

13.0 **Alarm Signalling**

Fire signals from all flow-switches and fault signals from all monitored isolation valves shall be wired into the Zonecheck Addressable controller available from Project Fire Products Ltd. Additional alarms in accordance with table 5 of BS 9251:2021 shall be integrated into the Zonecheck Addressable controller or other suitable centralised monitoring panel/device.

It should be noted that where alarms are to be provided in large and/or multi-storey buildings, the owners or the AHJ may specify different alarm arrangements to suit the particular needs of the occupants. The advice of stakeholders should be sought at the design stage.

14.0 **Service and Maintenance**

All service and maintenance works shall be carried out in accordance with section 7 of BS 9251:2021 by a 1048 Level 4 approved sprinkler contractor certificated by the LPCB. All works shall include a five-year guarantee on all system components and any quotation must identify three and five year quotes for all parts and labour.

15.0 **System Commissioning**

The system shall be commissioned in accordance with 6.2 of BS 9251:2021. The sprinkler contractor shall be available on site for system commissioning which shall be witnessed and signed off by the main contractor and/or consultant and/or client.

Individual apartments and floors can be inspected and signed off in advance of final commissioning by agreement with stakeholders.

16.0 **Documentation**

All documentation shall be provided in accordance with 6.3, BS 9251:2021. Snagging sheets shall be submitted 14 days prior to commissioning. O&M manuals shall be provided in digital format and made available at or prior to commissioning.

17.0 **Addressable Flow-switch Testing System**

The flow-switch test system will be managed by the UL approved Zonecheck Addressable system. The contractor shall demonstrate their experience of design and install of addressable flow-switch management system by referable projects or have attended the manufacturers training course.