

1.0 GENERAL

.1 Summary

- .1 These standards apply to all Fire Suppression sections of Divisions 21.
- .2 These general requirements also apply to fire system design requirements found in other sections.
- .3 Additional BCIT fire suppression design and approval requirements may be required.

.2 Related BCIT Standards

- .1 Section 09 90 00 Painting and Coating.
- .2 Section 22 05 00 Plumbing - General Requirements.
- .3 Section 22 05 53 Identification for Plumbing and Equipment.
- .4 Section 25 00 00 Building Automations Systems (BAS) Design Guidelines.
- .5 Section 28 46 00 Fire Alarm Systems.
- .6 Section 01 78 39 Project Record Documents.

**Intention is for all Record Documents (O&M Manuals, Record Drawings, etc) to be provided separately for Fire Suppression Systems. Division 21 documents should not be bundled with Division 22 – 25 unless expressly permitted by BCIT.*

**All contract documents and 'as built/record' drawings must meet criteria outlined in NFPA 13, Chapter 6.0, Plans and Calculations. All calculations must be sealed by a Professional Engineer registered in British Columbia.*

.3 References

- .1 NFPA 13 (Latest Edition).
- .2 NFPA 14 (Latest Edition).

.4 Coordination Requirements

- .1 Coordinate with BCIT Building Operations - Facilities Services and Project Services. BCIT Building Operations will review documents at 50%, 75%, 90% and Pre-Tender stage for all projects, depending on project complexity.
- .2 Coordinate verification of the sprinkler system with BCIT Safety and Security Emergency Management (SSEM) and Sprinkler Fitters. Contact the Authority Having Jurisdiction in advance of verification to provide opportunity for work crews to be present during verification.
- .3 Whenever fire suppression may be temporarily suspended, in buildings/facilities with Occupancy Permit, a Fire Watch must be called for which conforms to the requirements of BCIT SSEM and Fire & Rescue Services of the Authority Having Jurisdiction.

Consultants are to provide complete specifications, and review these Technical Standards documents to include BCIT requirements within the specifications as applicable to the project.

- .4 Information on water supply available for fire suppression must be obtained from BCIT Facilities Services.

2.0 PRODUCT AND DESIGN REQUIREMENTS

.1 Submission of Design Philosophy

- .1 To BCIT Facilities Services, submit a design philosophy for the proposed building fire suppression systems. Major components of the philosophy must be accepted in principle by Facilities Services before the project can proceed to Construction Documentation. Consultants are expected to produce designs that meet user needs and allow Facilities Services to continue to meet those needs in the future in a safe, efficient manner.

.2 General

- .1 New facilities at BCIT are to be fully sprinkler protected unless otherwise stated by BCIT.
- .2 For renovated spaces, confirm with BCIT if sprinklers are to be added or updated.
- .3 Fire sprinkler protection at BCIT is consistent to standard industry practice. Deviations are intended to increase system longevity and provide flexibility for subsequent renovation.
- .4 Required fire flows must be calculated for all new buildings and be included in the approval process.
- .5 All fire suppression systems shall be designed by Consultants specializing in fire suppression design. Mechanical Engineers wishing to undertake the designs must demonstrate that they possess fire suppression design experience to ensure that designs do not only meet the minimum code requirements but meet specific building requirements which can only be evaluated by an expert in the field.
- .6 Fire Pumps: Specify fire pumps only after consulting with BCIT Facilities Services and providing regulatory requirements for such an installation.
- .7 Fire Hydrants: The minimum height dimensions to the lowest butt (to the underside and centre dimensions) to meet the requirements of Authorities Having Jurisdiction.
- .8 Fire Hose Cabinets are not preferred. Where applicable, existing fire hose cabinets shall be deleted (e.g. projects revising non-sprinklered to fully sprinklered spaces). Coordinate requirements with BCIT Facilities Services and SSEM.
- .9 Sprinkler Head Guards: Provide ULC Listed sprinkler head guards for sprinkler heads subject to mechanical damage, such as mechanical or electrical service rooms, equipment rooms, storage or janitor's rooms. Give special consideration to project-specific shop areas or other special circumstances.

.3 Painting

- .1 Paint all exposed only fire suppression piping and equipment. Colour: red.

Consultants are to provide complete specifications, and review these Technical Standards documents to include BCIT requirements within the specifications as applicable to the project.

- .2 Specify at least one coat of corrosion resistant primer paint to ferrous supports and site fabricated work.
- .4 System Drains**
- .1 System drains shall be piped to floor drains, provide minimum 76 mm (3") deep traps to sanitary connection.
 - .2 All low point drain valves shall be mounted at maximum 2m AFF and the associated piping shall allow for discharge into a floor drain or to the building exterior.
- .5 Spare Parts**
- .1 Specify spare parts to suit location and critical nature of projects.
 - .2 Furnish spare parts in accordance with Section 01 77 00 Closeout Procedures and:
 - .1 Design Consultants shall specify sufficient numbers of spare sprinkler heads of all types used on the project. One set of packing for each pump. One casing joint gasket for each size pump.
- .6 Building Fire Suppression Water Service**
- .1 Each building shall have a separate water service. No building shall be fed from another building.
 - .2 Provide an approved backflow prevention assembly, complete with monitored tamper switches on isolation valves, for every building fire suppression system.
- .7 Fire Sprinkler Systems / Standpipes**
- .1 Provide floor control valves and drains on each floor within a stair enclosure in multi-story buildings.
 - .2 Floor control valves and piping may be concealed if a sufficiently sized access panel is provided to allow for maintenance and testing. Confirm acceptable size with BCIT.
 - .3 The design criteria for the fire sprinkler system shall be established per NFPA 13.
 - .4 Provide a shut off valve (to be easily accessible and visible) at the base of each standpipe. *Do not locate in crawl space.*
 - .5 Provide access to all fire suppression equipment.
- .8 Products and Materials**
- .1 All materials and equipment in the system shall be new and current products of a manufacturer regularly engaged in the production of such materials and equipment such as: pipe, fittings and couplings, hangars and supports, earthquake bracing, valves, and sprinklers.
- .9 Sprinklers Subject to Freezing**
- .1 Provide a dry system, not an anti-freeze system.

Consultants are to provide complete specifications, and review these Technical Standards documents to include BCIT requirements within the specifications as applicable to the project.

- .2 Where sprinklers must be wet and are subject to freezing, it must be heat traced, and connected to the fire alarm panel.

.10 Dry Pipe Alarm Valve

- .1 All dry pipe systems shall be ULC listed.
- .2 Provide a dry pipe alarm valve, trim package, accelerator and air maintenance device, all by the same manufacturer. For example, Viking.

.11 Air Compressor

- .1 Provide ULC listed air compressor or maintenance device, sized to completely refill the system within 30 minutes. The air compressor must be quiet, (Max. 60 dbA) unless in a basement mechanical room.
- .2 Air Compressor must be oil, floor mount, and no tank.
- .3 Set the dry pipe system air pressure at the maximum recommended by the information sheet for the dry pipe valve or at 20 psi greater than the standard calculated trip pressure.
- .4 All 13mm (½") check valves must have a soft seat.
- .5 Compressor shall be wired to a Life Safety electrical panel.
- .6 All Pre-Action System and Dry System compressors shall be dedicated to Life Safety and shall not serve any other purpose.
- .7 All Pre-Action System and Dry System compressors shall be mounted using suitable vibration isolation, using flexible air line that is rated to a minimum of 1.5 times the maximum psi rating of the compressor and with at least 1m clear space above and on one side to allow for maintenance.

.12 Inspector's Test and Drains

- .1 Provide inspectors test valves for each floor of each system. For dry systems the inspector's test shall be located at the hydraulically most remote part of the system. Discharge into a drain riser located adjacent to the system riser or into a drain for a remote inspector's test valve when provided, for example, in dry systems. The valve shall be readily accessible.
- .2 Provide main drains at all system and floor control valves. Discharge shall be into drain risers for a multi-story building. Drain risers and main drain for single story buildings shall discharge to a safe location outside the building wherever possible. Provide splash blocks to limit damage to landscaping. Where outside discharge cannot be achieved, discharge shall be to minimum 6-inch floor drain, with a funnel. Do not pipe any sprinkler system drain line directly into a drain; there must be at least a 13 mm (½") gap between the pipe and the funnel/drain.
- .3 Provide auxiliary drains at all low points of the system. Provide an auxiliary drain for each floor of the building within a building stairwell hydraulically remote from the floor

control assembly. The drain shall consist of, as a minimum, a valve, a 19 mm ($\frac{3}{4}$ ") brass nipple with 19 mm ($\frac{3}{4}$ ") male hose threads, and cap.

.13 Fire Department Connection

- .1 The check valve and ball drip shall be located in the mechanical room.
- .2 A fire department connection shall be provided on the system riser, and installed in an area accessible for the first response unit.
- .3 A sign indicating "Auto Sprinkler" or similar shall be provided as a part of the escutcheon. A separate red sign with white lettering shall be permanently affixed to the building. The sign should read "Fire Department Connection", with the letters 51 mm (2inch) high, and the building address underneath with the letters 25 mm (1inch) high.
- .4 Provide 64 mm (2 $\frac{1}{2}$ inch) polished brass hose valves with a cap and chain. Turn the outlet at an angle of 45° from the wall.

.14 Hose Valve

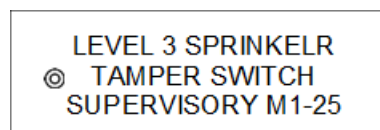
- .1 Hoses are not to be racked in the cabinets and shall be folded over and rolled up.

.15 Spare Sprinkler Cabinet

- .1 Provide spare sprinklers and escutcheons for 10% of each type and style of sprinkler used in accordance with NFPA 13 and proportioned based upon the number of each type and style of sprinkler used on the job. Include a wrench for each type of sprinkler in the cabinet. The cabinet is to be red with a nameplate indicating "SPARE SPRINKLER CABINET".

.16 Identification for Fire Suppression

- .1 Provide all control, drain and test valves with signs identifying the type of valve and the area (floor or portion of the building) affected by the valve. Submit the wording to BCIT Facilities Services for approval. For example:



- .2 The signs are to be hung by a chain from the device.
- .3 Signs shall also indicate, especially on dry pipe systems, those valves which should be kept normally open or normally closed.

.17 Pressure Gauge

- .1 Provide a 76 mm (3 $\frac{1}{2}$ inch) diameter pressure gauge with the appropriate scale at the main incoming water. Also at each valve station, base of every riser, above and below alarm valves, before and after check valves, at any compressors or pumps, and at any pressure switches.

.18 Drum Drip

- .1 Provide a drum drip per NFPA 13 at the low drain points on a dry system.

3.0 EXECUTION**.1 Final Functional Testing**

- .1 Certify fire systems have been tested to meet requirements of BCIT and Authority Having Jurisdiction.
- .2 Insulate or conceal work only after testing and approval by Authority Having Jurisdiction Inspector.
- .3 Conduct tests in presence of Authority Having Jurisdiction Inspector if required.
- .4 Coordinate verification of the sprinkler system with BCIT Facilities and SSEM. Contact BCIT Facilities and SSEM in advance of verification to provide opportunity for work crews to be present during verification.

***** END OF FIRE SUPPRESSION – GENERAL REQUIREMENTS SECTION *****